MARCH

MODERN MECHANIX

ND INVENTIONS

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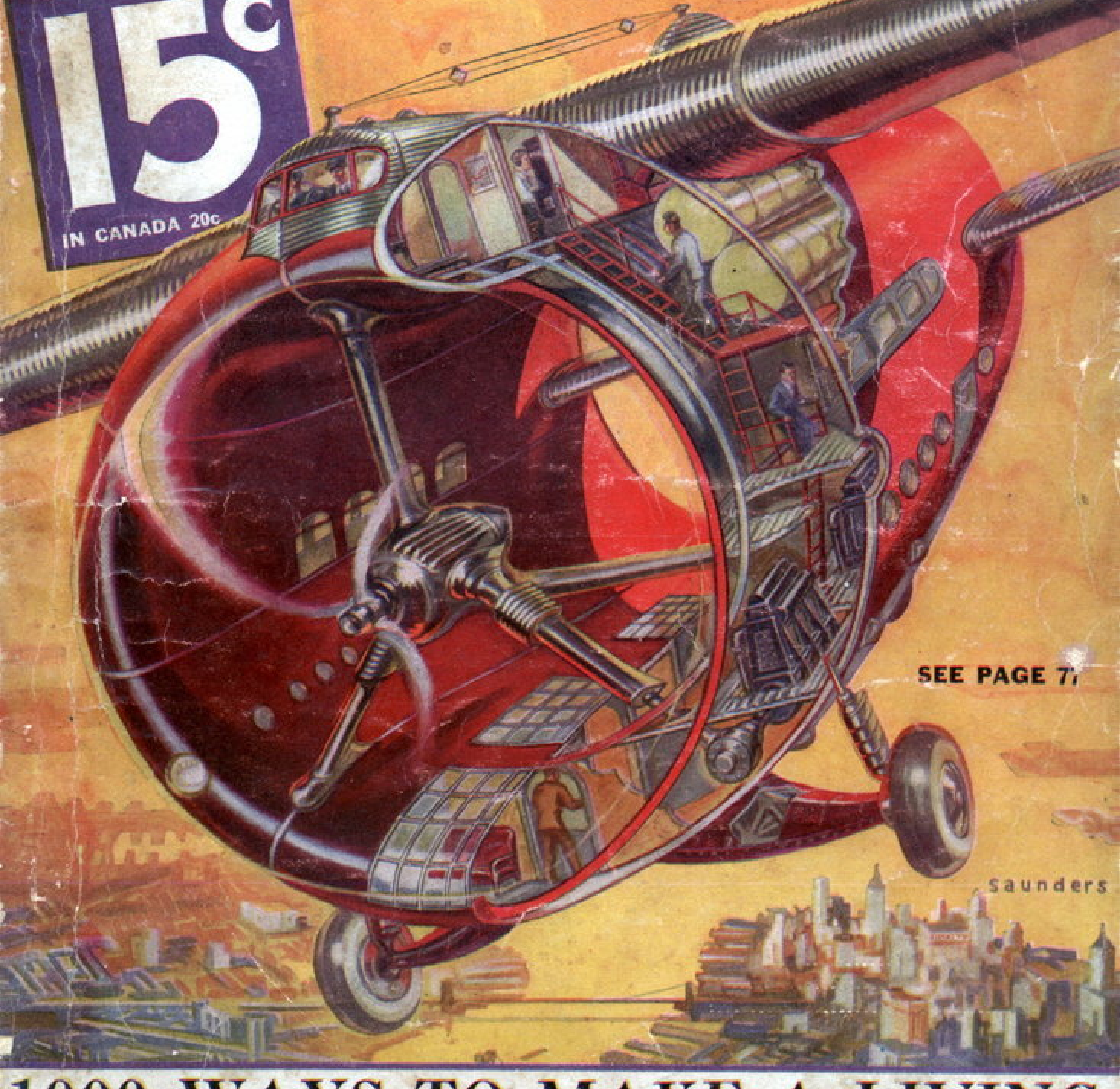


SEE PAGE 7

1000 WAYS TO MAKE A LIVING

All WAVE RADIOS
at NEW LOW PRICES
[15 to 560 Meters]

8-TUBE
Long and Short Wave
SUPER HETERODYNE
now only $18.50
COMPLETELY ASSEMBLED with LARGE SPEAKER

30 DAYS FREE TRIAL

Up goes the quality! Down goes the price! Midwest has scored another tremendous hit by bringing the ALL-WAVE radio within reach of every buyer. For only $18.50, radio fans can buy this 8-tube LONG and SHORT wave super-heterodyne chassis, completely assembled with electro-dynamic speaker. Never before such sensational value. Never before so much radio for so little money. Six months ago, such quality and such prices would have been impossible. Think of it! Super power, four distinct wave bands, 15 to 560 meter tuning range, coast-to-coast reception, police calls, foreign reception . . . all for as little as $18.50. Only Midwest radio engineering skill backed by the engineering talent of R.C.A. and Am. T. & T. could produce such sensational radio value. Mail the coupon or write us a postal. You'll be amazed when you get full details.

only $5.00 DOWN PUTS THIS RADIO IN YOUR HOME

What Midwest Owners Say

J. S. Kline, McGeehee, Ark.—"Listened to a set costing $150.00 but would not swap my Midwest for the higher priced one."

A. Edwards, 2125 North A St., Elwood, Ind.—"We wouldn't trade our Midwest for any of the numerous more costly sets."

Emmet Berry, 222 29th St., Ashland, Ky.—"The Midwest cannot be beaten by any other radio that costs twice as much."

Milton T. Lyman, 2525 Merwin St., Shreveport, La.—"Just as good as sets selling for double Midwest prices."

Walter Fahrig, 1304 Highland Ave., Alton, Ill.—"Midwest is the best. Friends think I paid about $300 for it."

H. R. Peper, 436 Ferry St., New Haven, Conn.—"A neighbor of mine who recently purchased a $200.00 radio went home very much dissatisfied after listening to our Midwest."

Deal Direct With Factory-Save UP TO 50%

Midwest sweeps aside the costly old-fashioned way of selling through distributors and dealers. You buy direct from the Midwest factory. You save the middlemen's profits.

Investigate! Mail the coupon. Get the Midwest catalog. Learn the facts about the new Midwest 8-tube ALL-WAVE sets—also 6-tube sets, Battery sets and new Automatic Record Changing Radio-Phonograph at an extremely low price. Learn about our sensationally low factory prices, easy payment plan and positive guarantee of satisfaction or money back. Get a bigger, better, more powerful, better toned radio—at a positive saving of 30% to 50%!

MIDWEST RADIO CORP.
(Est. 1920)
Dept. 192 Cincinnati, Ohio

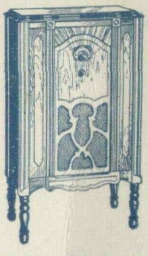
MAIL THIS COUPON Now!

Midwest Radio Corp.
Dept. 192
Cincinnati, Ohio.

Without obligation on my part send me your new 1933 catalog, and complete details of your liberal 30-day free trial offer. This is NOT an order.

Name..........................
Address..........................
Town....................State........

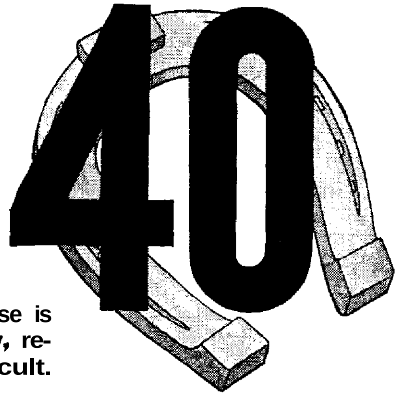
NEW CONSOLE MODELS AS LOW AS $21.85



COMPLETE WITH TUBES

Also amazing new long wave console radio at a sensationally low price. Six new type tubes, dynamic speaker, automatic volume control and other new up-to-the-minute features found in sets selling for $75.00 to $100.00. Don't buy any radio until you get all the facts. Mail the coupon or write us a postal now.

IF YOU'RE 40 OR UNDER you are lucky!



If you are over 40, your case is not hopeless—but, frankly, readjustment is more difficult.

IT IS highly probable we are in the beginning of a new economic era. Old customs are passing, new standards are being inaugurated. Things that were good yesterday and are passable today will be obsolete tomorrow.

If you are 40 or under, you have absorbed the background of the old era but are not so fixed in your habits that you cannot adjust yourself to the new order and profit by this readjustment. You can forge ahead without remembering too much about the "good old days." You can accept the future as a challenge rather than view it as a comparison. Success *can* be a bright picture on your horizon. Repeat that word—*can!*

Success *can* be a bright picture if you paint it with your own ability, your determination and —adequate *training!* And without this *training* you will be lost! *Training to do a job letter* is the demand of this decade. And the magnitude of this demand is increasing every day.

How can you get this training? Not entirely by applying yourself to the job at hand. Your outlook must be broader. Your training must be in advance of your opportunities. This is why far-seeing men, in all professions and all lines of work, are enrolling for training courses with the International Correspondence Schools. For forty years this institution has been a practical educational force in the lives of ambitious men. Today its service is more valuable than ever. Are you interested in this service and how it can help you be more secure . . . how you can make greater progress and earn more money? Then the coupon here challenges your consideration!

INTERNATIONAL CORRESPONDENCE SCHOOLS

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☐ Aviation Engines
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Name.. *Age*.................. *Address*..

City.. *State*.................. *Occupation*..

If you reside in Canada, send this coupon to the International Correspondence Schools Canadian, Limited, Montreal, Canada

March,
1933
VOLUME IX
NUMBER 5

MODERN MECHANIX AND INVENTIONS

DONALD COOLEY
Editor

PRICE 15 CENTS
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Yearly subscription, $1.50 a year in U. S. and possessions. Subscribers whose subscriptions were entered at the old rate of $2.50 per year will have them extended at the new rate.

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Published monthly by Modern Mechanix Publishing Co., at 529 7th Street So., Minneapolis, Minnesota. MODERN MECHANIX AND INVENTIONS entered as second class matter September 20th, 1928, at the Post Office, Minneapolis, Minnesota, under the act of March 3rd, 1879. Jack Smalley, Managing Editor. Copyright 1932. Advertising Office: Chicago office, 35 East Wacker Drive (Phone State 2955); New York office, 52 Vanderbilt Avenue, Room 1603 (Phone Murray Hill [illegible]). All manuscripts should be addressed to our editorial office at 529 So. 7th Street, Minneapolis, Minn. Manuscripts will not be returned unless accompanied by return postage. Advertising forms close on the 20th of the third preceding month. Price 15 cents a copy, $1.50 a year in the United States and possessions. In Canada, 20c per copy, per year $2.25. Other Postal Unions, $2.00 per year. Printed in U. S. A.

Worth $5.000 To Him

"I wouldn't take $5.000 for what you've done for me," writes C. B Sterling. "Your training has actually increased my income over 900%." Shortly after enrolling, he led the sales force of his company.

A 300% Increase!

From S75 a month to S300 and more per month — that's the jump M. B. Scholes made thru N. S. T. A. Credits N. S. T. A. training with his success and N. S. T. A. Employment Department for his present big pay job.

$5,000 A Year!

Ask J. A. Ferland if N. S. T. A. training pays. A French-Canadian railroad man—little education in English, N. S. T. A. training won him a sales managership at $5,000 a year to start.

Earns 2 Years Pay In 3 Months

J. M. Huppert, a $23 a week plumber's apprentice, found selling furs easier and more profitable than fixing leaks after N. S. T. A. training. In his first 3 months he had made more money than in two years at his old job.

Last Years Pay Looks Like Small Change to These Men Today!

Doubled His Pay

A. Robitaille found in N. S. T. A. training "a lifetime of selling experience." "My earnings have jumped to 100% more than I got at the time I began studying your course."

His Own Boss—At Doubled Wages

"I'm my own boss now," proudly writes W. Hayes, an N. S. T. A. graduate, "Since taking this course I have more than doubled my income." In one week three other concerns tried to hire him away from his job.

Here are six men who were formerly caught in the hopeless tread-mill of low-pay jobs. Today every one of them reports earnings from $4,000 up to $10,000 a year! Right now —the same opportunity that changed their lives so completely is open to you! Don't fail to read every word of this vital message!

When a man who has been struggling along in a low-pay job suddenly steps out and starts earning real money—$5,000, $7,500 or $10,000 a year, he usually gives his friends quite a shock. It is hard for them to believe that he is the same man they used to know. Take one of the men whose pictures appear on this page—J. M. Huppert, for example. Huppert was a plumber's apprentice at $23 a week. If he had predicted that he was about to make two years' pay within a period of three months, his friends would have thought he was joking. But he knew what he wanted, and he set about getting it in the shortest possible way. "The Key To Master Salesmanship" opened his eyes to the opportunities in the selling profession. This book proved that Master Salesmen are made, not "born." It told facts and secrets about money-making that were a positive revelation. And best of all, it outlined a simple plan that enables men from all walks of life to quickly reach the top without spending years on the road—without losing a day or a dollar from their present positions!

A Few Weeks—Then Bigger Pay

Huppert seized the opportunity to qualify as a Master Salesman, and has richly profited by it. He now reports an increase of many times his former weekly earnings, and his future possibilities are unlimited. Some of his former friends perhaps say he was "lucky." He was. But his "luck" lay in his decision to cast his lot with the N.S.T.A. Thousands of other men have been similarly "lucky." Some report increases ranging up to 900%. They have forgotten the days when they were caught in the rut—but they never forget that they owe a great part of their success to N.S.T.A. training.

NATIONAL SALESMEN'S TRAINING ASSOCIATION
Dept. C-705, 21 W. Elm St. Chicago, Ill.

Send for These FREE Books!

You may have doubts in your own mind about how salesmanship can help you solve your own problem. If so. all the more reason to send for these two books: "The Key To Master Salesmanship" and "Mistakes Commonly Made In Selling." See for yourself what salesmanship has done for thousands already; see how this training has brought sudden success to men who thought they were doomed to failure, after disappointing experiences in sales work. No matter what your experience has been, or what your present thoughts on selling are, send for these two books today and learn these amazing new facts. Mail the coupon now!

National Salesmen's Training Association,
Dept. C-705, 21 W. Elm St., Chicago, Ill.

Without cost or obligation I will accept copies of your books "The Key To Master Salesmanship" and "Mistakes Commonly Made In Selling," with details of your System of Training and Free Employment Service.

Name...

Address...

City.............................State.............

Age........... Occupation.....................

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EDITED BY EXPERTS

Listed here are the members of the Modern Mechanix Board of Editors, all qualified by national repute to serve as authorities. They will gladly answer questions from readers if stamped envelope is sent. Address them in care of this magazine, 529 S 7th St., Minneapolis, Minn.

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The Chance of a **Lifetime**—

It's Calling **You**—**Are** You **Ready?**

THINGS are breaking fast in business today. Management is checking, testing—every method and every man. Whole regiments of old employes are being swept out—and new blood is coming in. Privates are moving up toward presidents' chairs, and high executives are falling back toward clerical desks. Old companies are going out—new companies are springing up. Change, change, change—in a resolute effort to meet the new conditions of today—and tomorrow.

And each change, as it occurs, fairly shouts at you—"*Here is opportunity—step in NOW, and make your bid for power!*"

Times of change are times of progress—for the man who really wants to get ahead. In good times, staffs and policies were fixed—what matter that you were a better man or had a better plan—business was booming, why make a change?

But the depression has burst the door wide open. The better man is sought—is given a chance—and if he succeeds, if he delivers results, he can practically name his own reward. Not only higher pay and advancement, now, but—what is more important—a choice spot on the crest of the wave when the business tide returns.

We get proof of this every day, as hundreds of LaSalle-trained men and women report progress. Pay raises while fellow-workers are being cut—rapid advancement, new responsibilities and opportunities—the result of training for today's new needs.

At the right are a few incidents*—picked from hundreds—and each is a direct challenge to you *to do likewise.*

If You Have **the** WILL We Will Provide the **Way**

Now—how about yourself?

You can hardly name any great American fortune, or point to any outstanding executive whose success foundation was not laid during a period of business change. Periods of change—unsettled conditions like the present—are periods of unusual opportunity.

Only get this straight—to succeed today and tomorrow requires more knowledge and ability than were necessary in the past. It means preparation—organized preparation—*training.*

ONCE in a Lifetime

This great transition in business—this wide-open attitude on the part of management—may not last much longer. It is not likely to occur again during your lifetime—or if it does occur, you will be older and with less time to enjoy its benefits. Your time to act is now.

Bigger jobs, bigger pay, greater recognition—they are waiting now for the man with the courage to qualify. Will you grasp them, or see them fade away as prosperity returns?

What you do with the coupon below is your answer. Mail it today!

**Names and addresses gladly given on request.*

You Can Win PRO-**MOTIONS—PAY RAISES—Like** These NOW

September 12, 1932

"LaSalle training — one-fourth completed—has just won for me a promotion to Local Manager of my company." W. K. L.

July 21, 1932

"I have just been called from the factory and placed in charge of the office with the title of Treasurer. . . . Without my LaSalle training, I would be completely lost, and an opportunity would have slipped through my fingers." J. L.

Sept. 29, 1932

"Today I was informed that my salary is increased 25 percent—effective October 1." L. S. W

August 27, 1932

"Since I began my training, I have received two salary increases. I think that is a record, considering the depression and the fact that I only began studying in June." V. B,

September 1, 1932

"Less than a year ago, when I started LaSalle training. I was a bookkeeper. A few weeks after my start, I was offered a position with a firm of accountants at a considerable increase in salary. Last February I was appointed Town Treasurer and Accountant. After that my salary was increased until it is four times what it was last Fall." G. L. W.

September 15, 1932

"During the past two and one-half years, I have had three promotions and where others in the firm were getting salary cuts, I have had increases." D. W. E.

Ask for one of these booklets—or a similar one on your own field of business. They are free.

Personnel Management
Accountancy
Law training for Leadership
Traffic Management
The Modern Executive

LaSalle Extension University
Dept. 3493-R, Chicago

I would like to have your special booklet—without any cost or obligation to me—about my opportunities and your success training in the business field I have checked.

- ☐ **Business Management**
- ☐ **Higher Accountancy**
- ☐ **Traffic Management**
- ☐ **Modern Salesmanship**
- ☐ **Law: Degree** of **LL.B.**
- ☐ **Commercial Law**
- ☐ **Expert Bookkeeping**
- ☐ **C. P. A. Coaching**
- ☐ **Commercial Spanish**
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- ☐ Personnel Management
- ☐ Business **Correspondence**
- ☐ Business **English**
- ☐ Effective **Speaking**
- ☐ **Office** Management
- ☐ Credit and Collection **Corres.**
- ☐ **Stenotypy**
- ☐ **Chain** Store Management

Name ________________________________ Age ________

Position ________________________________

Address ________________________________

LaSalle
Extension University

I WILL TRAIN YOU AT HOME

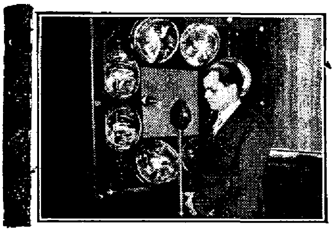
Many Make $50 to $100 a Week in Radio • • the Field *With a Future*

Broadcasting Stations employ trained men continually for jobs paying up to $5,000 a year.

Police Departments arc finding Radio a great aid in their work.. Many good jobs have been made in this new field.

Spare time set servicing pays many N. R. I. men $200 to $1,000 a year. Full time men make as much as $65, $75, $100 a week.

Talking Movies—an invention nude possible by Radio—employs many well trained radio men for jobs paying $75 to $200 a week.



Television—the coming field of many great opportunities—is covered by my course.

My book, "Rich Rewards in Radio," gives you information on the opportunities in Radio and explains how I train you quickly to become a Radio Expert through my practical Home Study training. It is free. Clip and mail the coupon NOW. Radio's amazing growth has made hundreds of fine jobs which pay $50, $60, $75, and $100 a week. Many of these jobs may quickly lead to salaries as high as $125, $150, and $200 a week,

Radio—the Held with a future

Ever so often a new business is started. You have seen how the men who pot into the automobile, motion picture, and other industries when they were started had the first chance at the big jobs—the $5,000, $10,000, and $15,000 a year jobs. Radio offers the same chance that made men rich in those businesses. It has already made many independent—will make many more wealthy in the future. You will be kicking yourself if you pass up this once-in-a-lifetime opportunity.

Many Radio Experts make $50 to $100 a week

In a few years 300,000 jobs have been made by Radio's growth. Thousands more will *be* made by its future development. Men with the right training—the kind of training I will give you in the N.R.I. Course—have stepped into Radio at 2 and 3 times their *former* salaries. Experienced service men as well as beginners praise N.R.I. training for what it has done for them.

Many make $5, $10, $15 a week extra in spare time almost at once

My course is world-famous as the one "that pays for itself." The day you enroll I send you instructions, which you should master quickly, for doing 28 Radio jobs common in most every neighborhood. Throughout your Course I will show you how to do other repair and service jobs on the side for extra money. 1 will not only show you how to do the jobs, but how to get them. I'll give you the plans and ideas that have made $200 to $1,000 a year for N.R.I. men's spare time. G. W. Page, 110 Raleigh Apts., Nashville, Tenn., writes : "I made $935 in my spare time while taking your Course."

Get ready for jobs like these

Broadcasting stations use engineers, operators, station managers and pay up to $5,000 a year. Radio manufacturers employ testers, in-

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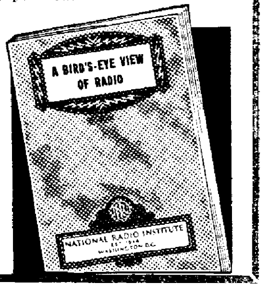

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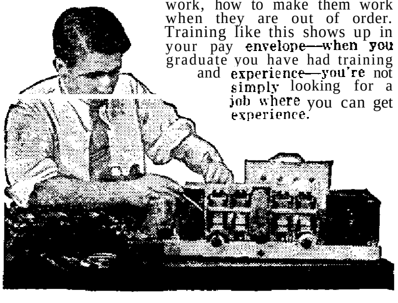

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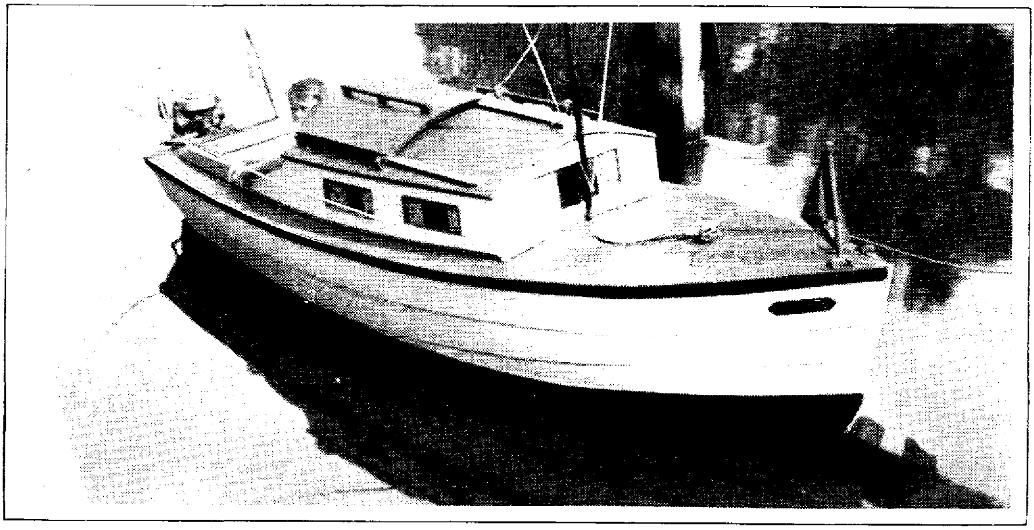

Robert Bosley, a 16-year-old Chicago lad, was inspired by the plans of Jack Hanna's 24 footer. He got the boat-building bug but his purse could not afford a "Dorothy," so he built his own version of that good ship in tabloid form. Result: 14 seaworthy feet of boy's size cruiser. A 4 h.p. outboard kicks her along. She "takes it" on Lake Michigan.

Andy's Shop Mail Box

The Depression has hit Andy, who comments upon its vagaries in his characteristic vein. Unusually fine letters and pics make this month's column interesting in spite of the growls of the grease monk.

IN THOSE days there were millions. Nobody asked the price of anything, and the giving was as easy as the getting.

Things are different now, need a gent named Andy tell you?

I first knew about the well known depresh when I found myself involved in tests on the efficiency of Flit, around my seedy bunk in the Robbinsdale Airplane roost. And when things get so tight that a grizmonk like me has got to count the number of potato bugs and roaches killed per spoon of insecticide, you can figger times is tough, bro. There ain't no moh millions, no suh.

Me and Archie the Roach are pals. Common suffering and a lack of stuffing for the old gastronomic thermometer tube makes it so.

And so from the monthly gripe, let's get into the land of dreams-come-true with the boys who have seen, have built, and are in concord. Let's let these letters and pix take us away from a sea of troubles:

Bob Bosley, a reader in Chicago, offers a treat with the fine shot of his little croosin' boat. He says:

6227 N. Artesian Ave.
Chicago, Illinois.

Dear Andy old sock:

I have been a continuous reader of your superb department ever since I purchased my first copy of your mag; two years ago.

The first place I turn to when I get the new edition monthly is, "Andy's Shop Mail Box," and gosh I think it is the nuts. Well, Andy now to get down to the tacks.

Inclosed find a couple snapshots of a little trunk cabin cruiser, 14 feet in length with a beam of 4 feet. She is of flat bottom design so she can be beached if the weather blows up too bad. The interior affords sleeping quarters for two, with a little galley and ice box on the port side at the rear of the cabin. She is a wonderful sea boat and I have taken her out when the waves would break solid over the front deck and smash against the ¼ plate glass window in the front.

She is powered with a four H. P. Muncie outboard motor and makes a cruising speed of six M. P. H. high speed of eight.

She is planked with ⅜ inch cedar and has white oak ribs and keel. The decks and cabin top is canvas covered.

My buddy and I have made numerous trips in her back and forth Chicago's water front and have not yet had the opportunity to make any long trips as she was just launched this last July. We got the idea to make a boat when the plans for the Dorothy appeared, but, them plans did not quite suit our tastes so here is the results.

I am 16 years of age and have had lots of experience with the construction of small cruisers and would like to hear from any other readers who are interested in same.

(Continued on page 16)

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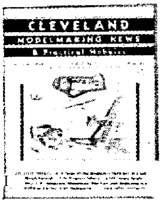

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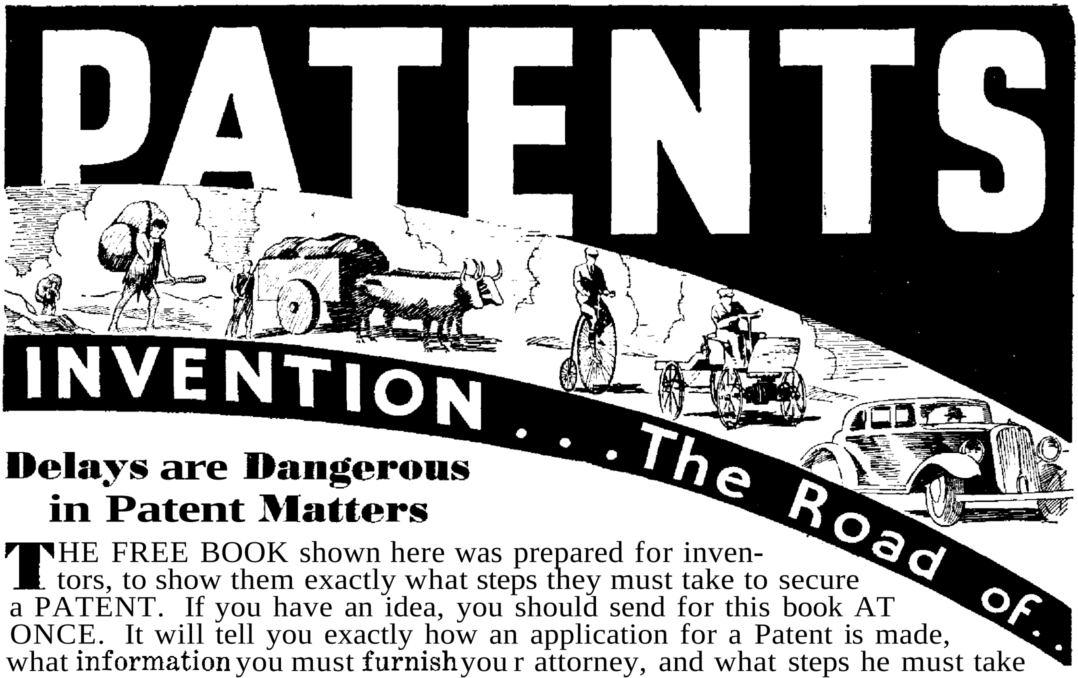

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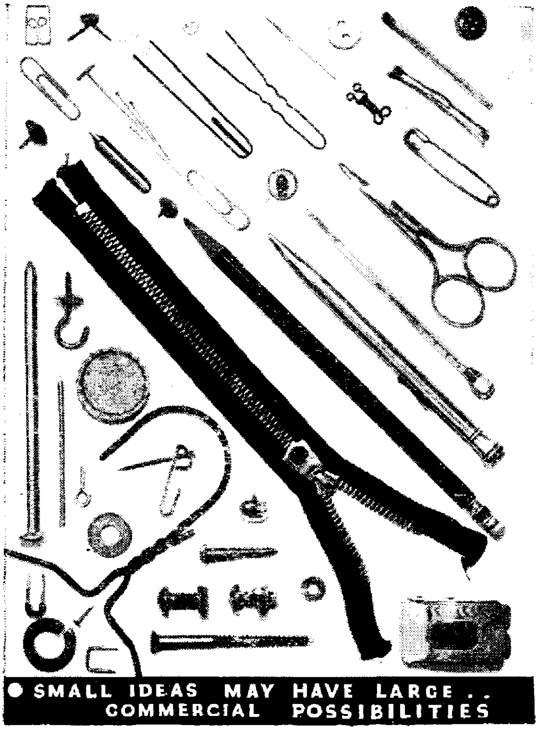

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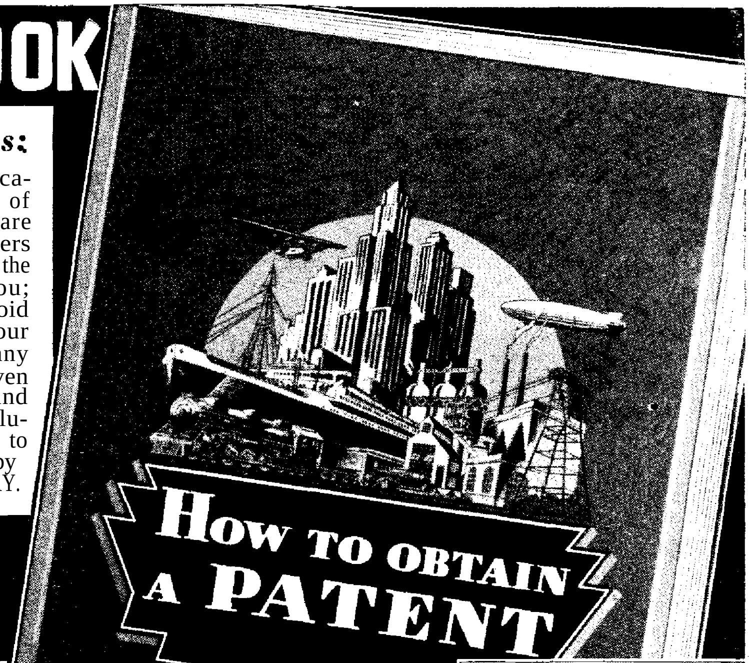
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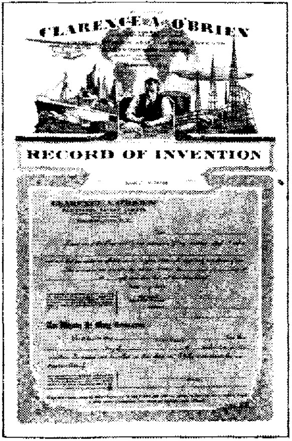

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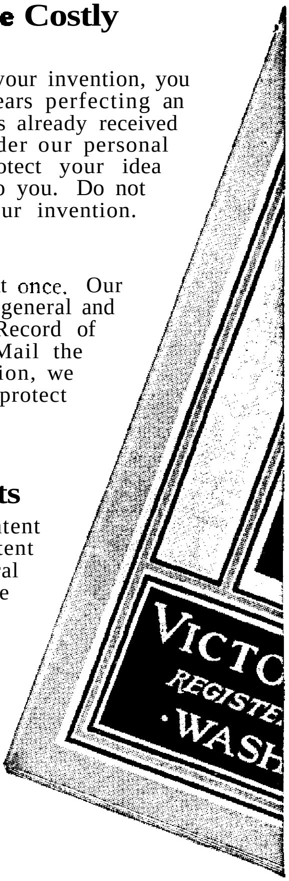

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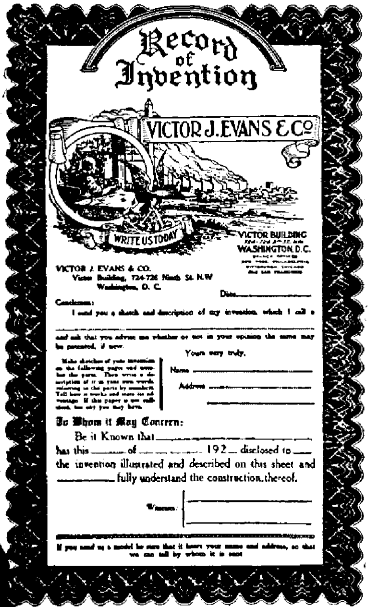

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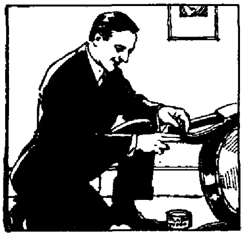

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ANDY'S SHOP MAIL BOX

(Continued from page 10)

Hoping, on bended knees, to see her picture in publication, I am,

Very sincerely,

Robert Bosley.

P. S. It took me and the boy friend about five months of off and on work to complete the project.

Tanks a lot, Bobbo. No need for you to get on your knees. Any pix with the romance that has, plus the sharp photography, will never go begging around, here.

* * *

Strange birds show up here at the field onct in a while. The other day I spotted a bright eyed, bashful chap about 30, dressed in hitch hiker's garb with leather jacket, overalls, and everything, shyly looking over the new Ford ship in the hangar. An officious local kiwi was all for doing the bum's rush act. I stayed him, asking the stranger what he wanted.

"Thought I might buy a ship," he said. You know the old gag. The kiwi said as much.

"What'll you use for money? Pants buttons?" Kiwi pipes out.

The ship wasn't sold, but it turned out the gent was a cattle rancher from Montana, had come to town with some cattle, and had a $4,000 stake on him in bills when we were doubtfully eyeing him.

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(Continued on page 18)

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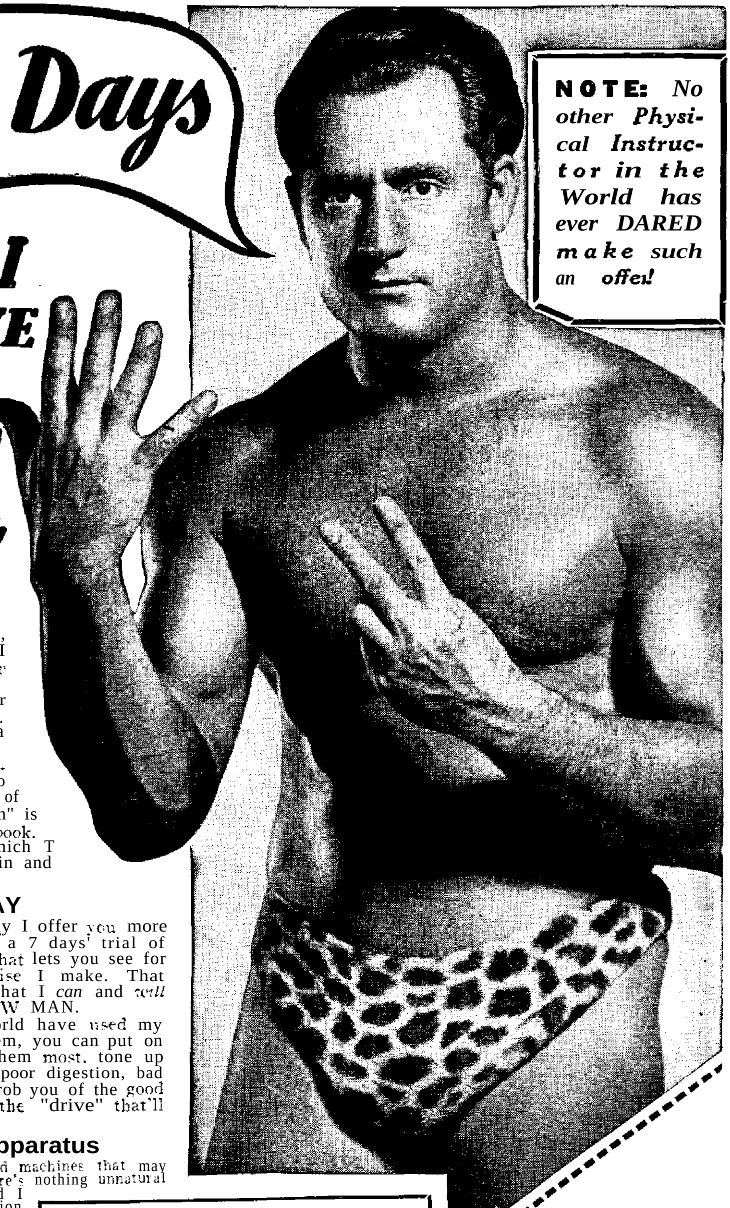

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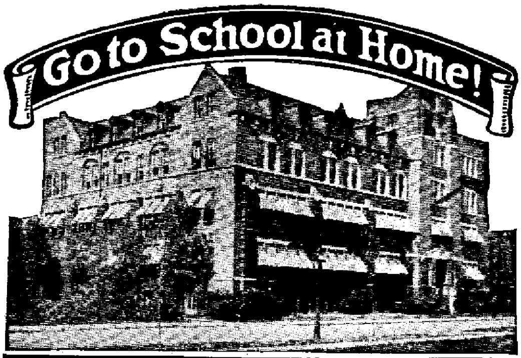

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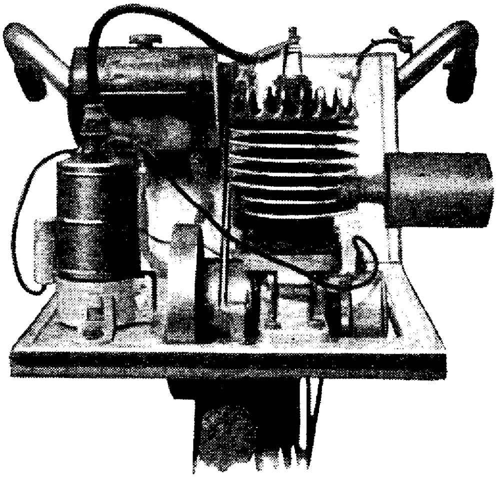
(Continued from page 16)



John Schncck builds a little motor for pushing bikes and small cars around. Neat little puffer, eh what?

I get a bang out of the little motor made by John Schneck, 8 West Detroit St., Calumet City, Illinois. Here's his letter.

Calumet City, Illinois.

Dear Sir:

Being a reader of your mechanical magazine would like to show you a one-cylinder two cycle 2" bore by 1⅝" stroke motor. Can be attached to a bicycle or used for other purposes. I want to sell the (unfinished) castings and blue prints. Enclosed find pictures of a finished motor. Thanking you for reply, I am

Yours truly,

John P. Schneck.

The pic is shown. Don't bother my greying temples with the why, where, and whens. Contact Johnny directly.

Illinois seems to be a hotbed of activity. Here's another:

Chicago, Illinois.

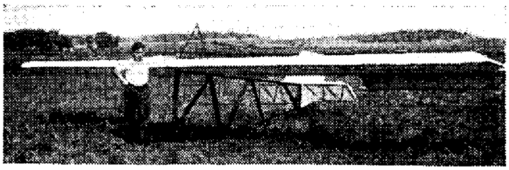
Howdy Andy:

I'm no author or any of that stuff, but I'm sending you a few lines and a snapshot of my glider that I built with the aid of my brother, Eddie.

We started from models, on to gliders, and soon ($) expect on to power jobs. Just now we are making a kayak to keep busy.

"Happy landings,"

Victor Brazauskas.



Here's a swell glider built by Victor Brazaukas and his brother, who live in Cheecago, Illinoise.

(Continued on page 23)

»»»»» These Four Famous «««««

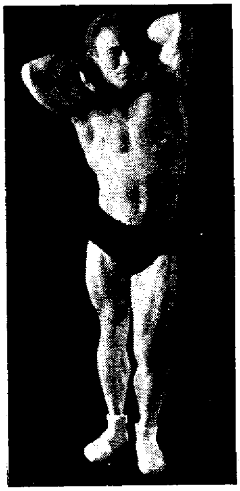
CHAMPIONS

Hold National and World's Records

They are all pupils of George F. Jowett and are now being trained by him for coming A. A. U. events

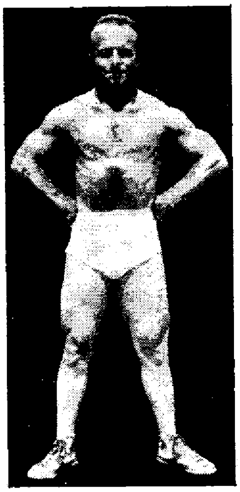
JOE MILLER

Joe Miller is a "natural". He holds many records on the Olympic lifts. He has "jerked" 290 pounds and "cleaned" over 300!



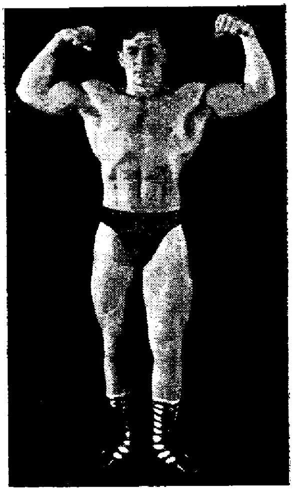
DICK BACHTELL

For 5 years National lightweight Champion! The only man in America to do more than his body weight in the one hand snatch!



ART LEVAN

The first American to emulate his teacher, George F. Jowett, and lift double his body weight in the two hand "jerk"!



BILL GOOD

First American regardless of body weight to exceed heavyweight totals on the 3 Olympic lifts. 311 lbs. with two hand "clean and jerk"!

I wish you could see these four boys working out. It would give you a great thrill to see them take a 250 lb. Bar Bell and "jerk" it overhead with apparent ease! Maybe you think they can't TAKE IT!

It makes me **mighty proud to know that I have trained these 4 famous champions** and I see no reason in the world why *you* can't "stack up" with the best of them. I am prouder still to think that there are more than 10,000 men who have taken my course in Physical Training in the last four years. If you could only read the enthusiastic letters they write me every day about the wonderful improvement they are making in their physical development—you wouldn't wait another minute to enroll!

So sure am I that I can do all that I say, that I make this unqualified guarantee . . the guarantee that no Physical Instructor has ever DARED to make . . .

»» I Guarantee to Add at Least . . .

3 INCHES TO YOUR CHEST 2 INCHES TO YOUR BICEPS

or it won't **cost you one cent! Signed: GEORGE F. JOWETT**

If my full course, if it does not do all I say—and I will let *you* be the judge—then it won't cost you one penny, even the postage you have spent will be refunded to you.

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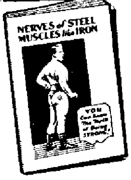

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A small outboard racer, extremely simple to build. Cleans up in B, C, and D classes everywhere. Strictly a speedboat — easily portable. Prints $1.00

CANVAS CANOE

The simplest type for the amateur builder. Blueprints give all dimensions for a job you'll be proud of. Price of prints, postpaid $1.00

RACING ICE YACHT

An iceboat of 175 ft. sail spread which cleans up in racing competition. New lumber for this job costs about $8. Designed by an experienced ice yachtsman who has turned out the utmost in speed and stability. Price of prints $1.00

MISCELLANEOUS

SHORT WAVE RADIO CONVERTER

With this converter you can hear short-wave programs from amazing distances on your own radio set. Inexpensive to build — blueprints give full instructions as well as diagrams. Price of prints $1.00

LONG HARLEQUIN MOTOR

The ideal light plane power plant, using Harley Davidson 74 cylinders and other stock parts. Develops 30 h.p. on 90 lbs. Picking up an old Harley motor cheaply, this dependable power plant can be built for under $50. Price of full-size prints $5.00

CAMPING HOUSE-TRAILER

Just the thing for vacation-time—a trailer with bed? and household equipment, with a collapsible canvas roof and sides which fold up when not in use. Four or mure can sleep in her. Price of prints $1.00

M-M SPORT ROADSTER

Blueprints, with full instructions for building, on an amazingly snappy and inexpensive job. Uses a motorcycle engine for power, chain drive—capable of 65 miles an hour, and looks like a custom built factory job at one-tenth the price! Price of complete prints $2.50

LIGHT AIRPLANES

PIETENPOL AIR CAMPER

The country's most popular home-built plane. Carries two passengers, powered with Model A Ford motor. High wing monoplane. Cost of construction, including motor, well under $500. Blueprints show both wood and steel tube fuselages, and give motor conversion details. Hundreds of these prints have been sold with complete satisfaction. Price of prints. . . . $7.50

PIETENPOL SKY SCOUT

A mate to the Air Camper. Single place, powered with Model T Ford motor. Cruising speed, around 75 m.p.h. The most satisfactory light plane with this type of motor. Price of blueprints $4.00

GERE SPORT BIPLANE

The leading light ship of biplane design. Incorporates latest design practices; fuselage is welded steel. Suitable for Model A Ford power plant, or any other motor up to 60 horsepower. Exclusive of motor, costs around $300 for materials. A real man-size ship that you can be proud to call your own. Price of blueprints $5.00

Modern Mechanix and Inventions, Mar MM
529 S. Seventh Street, Minneapolis, Minn.

Gentlemen:

Please send me my copy of the big new Blueprint Book by return mail. This comes to me without the slightest obligation.

I enclose $...... in payment for blueprints of..........
(Note: This form can be used if you wish any of the prints listed above without waiting for the descriptive booklet.)

Name ....
Address ....
City .... State............

ANDY'S SHOP MAIL BOX!

(Continued from page 18)

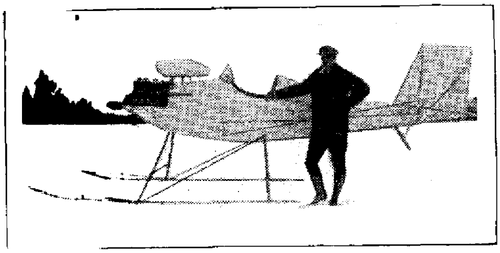
One of the most intelligently engineered snowsleds I ever see was built by Manville Huttemeier of International Falls, Minn. There's some sense and no little airplane feel about the job he has built.

406 3rd Street,
International Falls, Minn.

Dear Andy:

Inclosed you will find some pictures of a snowshed built by me last fall. This shed will make 55 miles an hour over snow. It is powered by a Henderson motor, and the propeller diam. is 54" x 42" pitch, which is made from your November issue M.M. and the body is made from the plans of Penguin Training Plane. I have been a reader of your magazine since 1927, and boy, it is a good magazine! Keep it up.

Yours truly,
Manville Huttemeier.



International Falls, **Minn.,** sees another **snowsled.** This **one was built** by Manville Huttemeier on a **Penguin** fuselage.

I want to pay a tribute to a really fine chap who I consider a Titan in his line. He works in a little Florida coast town, supporting his family at what he can turn his hand to honestly in these perilous times. His work calls for a lot of difficult client handling, yet he never gave a client a bum steer even if the cl. wanted something that wasn't good for him. Because he is honest in his work, and labors diligently over design details that are sound, and fashions plans of little and big seagoing yachts that are right, he has earned the respect of all naval architects who know immortality in a boat when they see it. This man is John G, Hanna, who lives at Dunedin, Fla., and who has improved boating for thousands by being a militant and kindly mentor in the sea's Spoil of Kings. Like the man with the better mousetrap, the world should beat a path to his door.

* * *

I picked Hanna's famous double ender model for a forthcoming how-to-build. She's named Tahiti. She is a real ship, suitable for cruising in the South Seas. You can go there in her, and that's why she's named Tahiti. Keep a weather eye peeled, mates. She's coming soon in juicy installments.

Incidentally, Dorothy, popular M-M & I 24 foot motor sailer, was Hanna designed. A number have actually been built as recently published shots show, and here is the latest, from Kingston, Ont.

(Continued on page 26)

Oilstoning—
He didn't believe it
— at first
SMELLING SALTS

"Yes, *I believe it"*

An **Open** Letter **From A Happy Man**

PUT this on your 'believe it or not' list. My promotion and raise came from reading and believing this statement: 'Every hand tool needs *oilstoning* often."

"I had all the boys in the shop oilstone their tools for a few minutes one morning as an experiment Ye gods! What a bunch of smiles! Cheerful workers, better work, faster work! Three months of this, and they gave me the big room with twice as many machines and men. I read about *oilstoning* in the Norton-Pike book—a brainful of the smartest dope on sharpening ever spilled on paper by some sharp who knows sharpness forward and backward."

A Mineral Museum Worth Seeing

If you saw all the sharpening stones, grinders, wheels, etc. in that fine hardware store downtown, all made by Norton-Pike, you would feel greedy for a private collection of your own. Take a look. Dealers like to show them and talk shop-talk.

NORTON. *Established 1823*
Use what Experts use
PIKE *Products*

BEHR-MANNING CORP., *Distributors for the U. S. A.*
Dept P, Troy, N. Y.

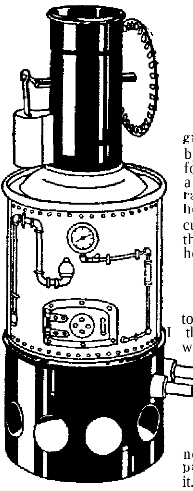
I'm *boning for* the Norton-Pike book, "How to Sharpen," I'm *sharp* enough to ask for it, since it's FREE

Name..............................

Address..............................

My dealer is..............................

THIS GREAT BIG STEAM ENGINE



25¢

Electric Model

Add 10c for postage and packing

The world's biggest value in mechanical toys. A great big steam engine, measuring 7 inches in height by 2½ inches in diameter (7½ inches in circumference) for ONLY 25 cents. You should see it run, too. It's a revelation to see the fly-wheel spin around at a great rate as soon as you "get steam up". The boiler is heated by electricity. Just hook up with your house current, fill the boiler with water, and in a few minutes the engine is running at top speed. No mussy canned heat or alcohol to bother with.

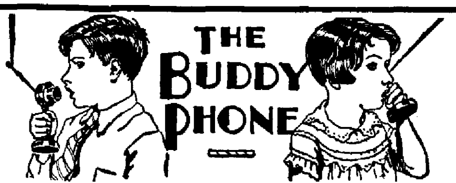
FULLY **TESTED—GUARANTEED** TO RUN

It is foolproof, harmless, fully tested and guaranteed to run. A scientific toy that illustrates the principle of the steam turbine. Runs for hours on one filling of water. Every boy should have one. Wonderfully well made—splendid value for the money. Easily worth a dollar, yet sells for **ONLY** 25e," with **10c** extra for postage and packing.

MAMMOTH NOVELTY CATALOG 10c

Add **10c** more if you want our gigantic catalog, nearly 800 pages of electric and other novelties, puzzles, tricks, jokes, etc. You never saw a book like it before.

JOHNSON SMITH & **CO.** **Dept. 919** RACINE, WIS.



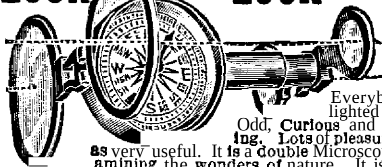
A Real Telephone. Works Indoors or Outdoors. 100 ft or 1000 ft.

Though this is merely a very clever toy, it is quite as serviceable for short distances as the most elaborate apparatus made and it [illegible] less liable to get out of order or to need adjustment; in fact it cannot be rendered inefficient unless roughly handled. No troublesome battery no intricate hook-up." Can be put to practical use from one room to another up or down stairs, around corners, etc. The patented sounding discs transmit and receive the voice perfectly, making it a really practical talking telephone. Set consists of two phones, transmission cord and full [illegible]

PRICE ONLY 65c per set postpaid. JOHNSON SMITH & CO.

LOOK 35¢ LOOK

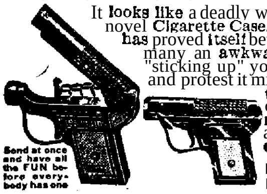
Wonderful Instrument.



Greatest **thing yet.** Nine **separate articles in** one. Everybody delighted **with** it. Odd, **Curious** and **interesting.** **Lots** of **pleasure as well as** very useful. It **is** a **double** Microscope **for examining** the **wonders of** nature. It is also an opera **Glass**, a Stereoscope, a Burning Lens, a Reading **Glass**, a **Telescope**, a Compass, a **pocket Mirror**, and a **Laryngoscope—for** examining **eye**, ear, **nose** and throat. It **is** worth all the cost to locate even one painful cinder **in** the eye. **Folds** flat and **fits** the **pocket.** Something **great—you need one. Don't miss it. Sent** by **mail. Only 35c or** 3 for **$1.00.**

PISTOL CIGARETTE CASE

It **looks like** a deadly weapon, but **it is merely** a novel **Cigarette Case. This** clever **contrivance has** proved **itself** better than the real thing **in** many an **awkward** encounter. Great fun "sticking up" your friends. They **squirm** and protest it might be loaded. **Pull** the **trigger** and the **slide flies** open disclosing the cigarettes. Well made, light and **compact.** Weight **only** 2 ounces.



Send at once and have all the FUN before everybody has one

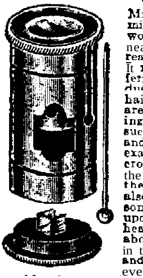
PRICE POSTPAID 35c

MICROSCOPE and FLOROSCOPE

COMBINES ALL THE POWER AND DEFINITION OF THE MORE EXPENSIVE MICROSCOPE

SURPRISINGLY GREAT MAGNIFYING POWER

EXAMINE GERMS IN WATER, CHEESE, SUGAR, ETC.

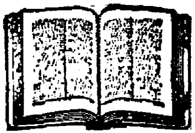


There are few things so interesting and valuable as a Microscope. It enables you to minutely examine mineral animal and vegetable specimens, to test cotton, wool, silk, seeds, water, flour, cheese, milk, and in fact nearly all articles of food. Unwholesome meat can be readily detected and ferments can be closely watched. It is exceedingly interesting to examine the spores of ferns, soda, sugar, salt, alum and other crystals, the dust (scales) from moth and butterfly wings, human hairs, flies and insects, while the animalculae in water are a never-failing source of wonder. Most interesting experiments can be performed with an instrument such as this. Place a small piece of cheese in a box and allow insects to feed on it for a day or two. Then examine a tiny portion of the cheese under the Microscope and you will see little animals, magnified to the size of large beetles; you can count their legs and the joints in them, the talons or claws upon each foot, also the hair or bristles upon their bodies. Or, obtain some stagnant water; deposit a small portion of scum upon the object glass of the Microscope with a pin's head, and you will see beautiful animalculae swimming about with as much freedom as though they were fish in the boundless ocean. It is a truly wonderful sight and an endless source of interest and enjoyment for everybody. The Microscope is made of brass and is 50 areas and although small and compact, it will [illegible]

Japan cover aver magn [illegible] paid.

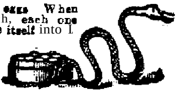
JOHNSON SMITH & CO. Dept. 919 RACINE, WIS.

MIDGET BIBLE



GREAT CURIOSITY Smallest Bible in the World. Size of a postage stamp. 200 Pages. Said to bring good luck to the owner. A genuine work of art. Must be seen to be appreciated. Make good money selling them to friends, church acquaintances, etc. PRICE **15c** each, **3** for **40c**, **12** for **$1.35**, **100** for **$7.50**. Also obtainable in Leather Binding, with gold edges. **Price 50c** each, 3 for $1.25, $4.50 per doz. **Magnifying** Glass (or use with **Midget Bible** 15e

SERPENT'S EGGS



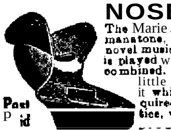
Box contains 12 eggs When lit with a match, **each one gradually hatches itself** into a **snake several feet long,** which **curls** and **twists about** in a most **life-like manner.**

Price per box. 10c postpaid. 3 for 25c

STAGE MONEY

With a bunch of these bills, it is easy for each person of limited means to appear prosperous **by flashing a roll of these bills at the proper time** and peeling **off** a **genuine bill** or two **from** the **outside of** the roll, the **effect** created **will** be **found** to be all that can be desired. **Prices, postpaid: 40 Bills** 20c, **120 for 50c, or $3.50 thousand postpaid.**

NOSE FLUTE



Post Paid 10c

The Marie **Nose Flute,** or **Humanatone, is a unique and novel musical instrument that is played** with **nose and mouth combined. There** is **just a** little knack **in playing** it **which, when once acquired after** a little **practice, will enable you** to [illegible] **music that somewhat resembles a flute. There is no fingering, and** once you have mastered it you can **play all** kinds of **music with** facility **and ease.**

JOHNSON SMITH & CO.

SURPRISE MATCHES

More fun than **fighting with your wife.** Look **just like ordinary matches. As** the victim **tries** to light one **he gets quite** a surprise.

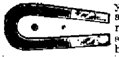
Price 10c per box, 3 boxes for **25c,** 12 for **75 cents.**

STAR TOY MAKER

Greatest [illegible]**'s'** book written. **Tells** how **to make** a **Pinhole Camera,** a Canoe, model **Railroad,** a **Telephone, Boomerang,** Telegraph **Instrument,** Box **Kite, Talking Machine,** [illegible]scope. **Electric Motor, Electric Door Bell, Water** Wheel, **Paddle Raft, a pair** of Skis, **a Dog** Sled, **Bird House,** Rabbit Yard, **etc.** **64 pages.** 150 **illustrations. PRICE 10c.**

BOY'S OWN **TOYMAKER.** A new **book. Tells** how to make **chemical toys, electrical toys, galvanic toys, mechanical toys, paper toys,** cardboard **toys, boats, traps, etc.** 200 illust[illegible] Price **25c postpaid.**

FUN WITH MAGNETISM. 50 novel and unique experiments in **MAGNETISM** that you can perform with the aid of an ordinary magnet; magnetic chain, fleeing and spinning needle, nail and ball cluster, magnetic fish, top, motor, magnetic billiard balls, many other stunts. Also interesting information about lodestone, magnetism, electricity, etc. **PRICE 10c p.pd.**



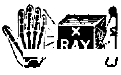
BOOK ON **BOATS.** How *to* build rowing, sailing boats. Everything pertaining to boats explained in plain terms so anyone can understand. Illust[illegible] **10c p.pd.**

5-MINUTE HARMONICA COURSE. A new easy self-teaching method. Teaches how to play, to use the tongue, tremolo, fully illustrated. **Price** 15c **postpaid.**

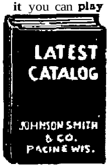
MONEY **MAKING** SECRETS. Golden opportunities for everyone. 64 page copyrighted book chock full of money-making ideas, recipes, formulas, wrinkles, trade secrets, etc. Businesses that can be started with little or no capital at home in spare time. **10c postpaid.**

TRICKS & SOCIAL **ENTERTAINER.** Contains hundreds of simple tricks, illusions, diversions that anyone can do. Also explains secret of second sight. **Price 25c postpaid.**

WONDERFUL X-RAY TUBE



A **wonderful** little **instrument producing optical illusions** both **surprising** and **startling. With it you can see** what **is apparently** the **bones of your fingers,** the lead in a **lead pencil, the interior opening** in a **pipe stem,** and **many other similar illusions. Price** 10c. 3 for 25c.

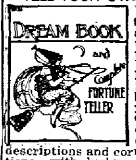

LATEST CATALOG
JOHNSON SMITH & CO. RACINE WIS.

JOHNSON SMITH & CO.

Dept. 919 RACINE, **WIS.**

A copy of our NEW CATALOG mailed on receipt of 10c. or the De-Luxe Edition with cloth binding 25c. Bigger and better than ever. Only book of its kind in existence. Nearly 800 pages *of* all the latest tricks in magic, the newest novelties, puzzles, games, sporting goods rubber stamps, unusual and interesting books, curiosities in seeds and plants, etc., unprocurable elsewhere. Remit by Coin, Money Order. Check or unused U. S. Postage Stamps, for all articles listed above. Canadian money, stamps and Postal Notes accepted if 15 per cent added for Exchange.

TELL YOUR **OWN** FORTUNE



With the aid of **this dream book** and fortune-teller. The key to your future. Will you be lucky in love? Successful in business? Will you be wealthy? Complete with dictionary of dreams with descriptions and correct interpretations, with lucky numbers, fortunate days, oracles, divination, palmistry, etc. Also tells how to tell fortunes by various methods, by grounds of coffee or tea, by dominoes, by marks, scars or moles, miscellaneous games with cards, lucky days, weeks, months, years; how to receive oracles by dreams, finger nail observations, etc. PRICE **10c postpaid.**

LEARN TO HYPNOTIZE

This 64-page book tells how. Explains all about Hypnotism, how to hypnotize, how to produce sleep, how to awaken a subject, how to hypnotize animals, hypnotism in diseases, hypnotism for scientific practice, illusions and halucinations, personal magnetism, thou[illegible] etc. **Written** in **plain,** everyday **language** that anybody can understand. **PRICE 10c postpaid.**

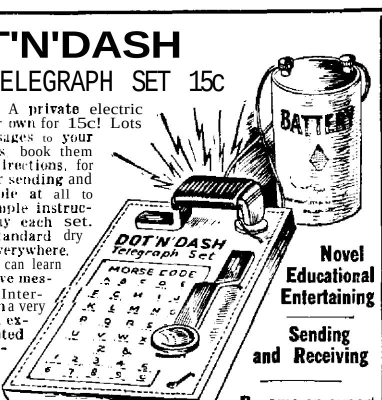
FORTUNE TELLING BY CARDS

64-page booh tells how. **Gives** the meaning of each and every card, how to deal **and** lay **them** out. **Everything explained** in simple language, PRICE **10c** postpaid.

Address orders for all goods on above and on following page ***to*** *Johnson Smith & Co., Dept. 919, Racine, Wis.*

DOT'N'DASH

ELECTRIC TELEGRAPH SET 15c



Here, you are boys! A private electric telegraph set of your own for 15c! Lots of fun sending messages to your friends. Get two sets, hook them up as shown in the directions, for two way messages for sending and receiving. No trouble at all to operate with the simple instructions that accompany each set. Operates on any standard dry battery obtainable everywhere. With this outfit you can learn to transmit and receive messages by the Morse International Code, and in a very short time become an expert operator. Mounted on wooden base measuring 4 x 3 inches, first class construction throughout, complete with key, sounder magnet, miniature Western Union blanks, packed in a neat box with full illustrated instructions — **ALL** FOR 15c (without battery) **postpaid.**

Novel Educational Entertaining

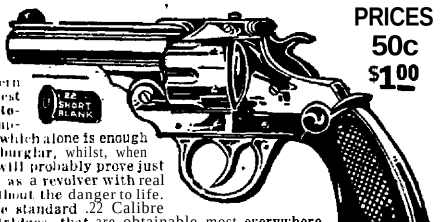
Sending and Receiving

Become an expert **Telegraph** Operator in a **very** short time

JOHNSON SMITH & CO. **Dept.** 919 **RACINE, WIS.**

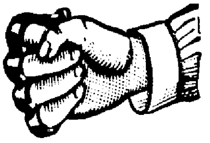
BLANK CARTRIDGE PISTOL

PRICES 50c $1.00



This well made and effective Pistol is modeled on the pattern of the latest type of Revolver, the appearance of which alone is enough to scare a burglar, whilst, when loaded it will probably prove just as effective as a revolver with real bullets, without the danger to life. It takes the standard .22 Calibre Blank Cartridges, that are obtainable most everywhere. Even the most timid woman can use it with perfect safety and frighten a thief without risk to herself or anyone else. A Great **Protection** Against Burglars, **Tramps** and Dogs. You can have it lying about without the danger attached to other revolvers. PRICE ONLY 50 CENTS. Better make **and superior** quality for **$1.00.** Blank Cartridges .22 **cal.**, 50c per **100.** **Cowboy type** Holster 50c. Not prepaid. Shipped Express only. JOHNSON SMITH & CO., Dept. **919**, RACINE, WIS.

SILENT DEFENDER



Used by police officers, detectives, sheriffs, night watchmen and others as a means of self-protection. Very effective. Easily fits the hand, the fingers being grasped in the four holes. Very useful in an emergency. Made of aluminum they are very light, weighing less than two ounces. Handy pocket size always ready for instant use. **Price 25c each, 2 for 45c postpaid.**

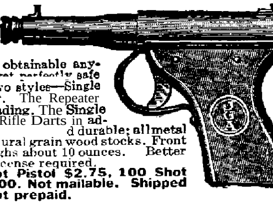
BIG ENTERTAINER

180 Jokes and Riddles, 21 Puzzles and Problems, Gypsy Fortune Teller, 50 Money Making Secrets, 36 Experiments in Magic, 58 Verses in Comic Poetry, 7 Parlor Games, 15 Card Tricks, 10 Funny Readings, 71 Toasts, Cut outs for Checkers and Chess, Dominoes, Fox and Geese, 9 Men Morris, Anagrams, etc. **All for 15c.** Postpaid.

MAKE YOUR OWN RADIO RECEIVER

Enjoy the **concerts**, baseball **games**, market reports, **latest** news, *etc.* This copyrighted book "EFFICIENT RADIO SETS" shows how to make and operate inexpensive Radio Sets, the materials for which can be purchased for a mere trifle. Also tells how to build a short-wave Receiver for bringing in foreign stations, police calls, ships at sea, etc. **ONLY 15c, postpaid.** *770 page catalog 10c.*

REPEATING AND SINGLE SHOT AIR PISTOLS



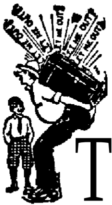
Shoots B.B. Shots

Just what you've always wanted. A powerful high grade Air Pistol, shaped like an Automatic, pocket size. Fires B. B. shot obtainable anywhere. [illegible] **perfectly safe for boys to** handle. **Two styles**—**Single Shot Pistol** or **Repeater.** The Repeater **fires 100 shots in one loading.** The **Single Shot Pistol shoots** Air Rifle Darts in **addition** [illegible] d durable; **all metal** parts nickel plated; natural grain wood stocks. Front and rear sights. Weighs about 10 ounces. Better than an air rifle. No license required. **PRICES: Single Shot Pistol $2.75, 100 Shot Repeating Pistol $5.00. Not mailable. Shipped by Express only. Not prepaid.**

Send remittance (Postage Stamps **accepted) for all articles** listed above, **also in our other ad** on previous page

BOYS! BOYS! BOYS!

THROW YOUR VOICE



Into a trunk, under the bed, under a **table,** back of the door, **into** a desk at school, or anywhere. You get lots of fun **fooling** the **teacher,** policemen, peddlers, and surprise and fool all your friends besides.

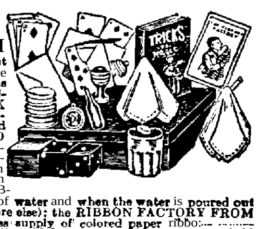
The Ventrilo

is a little instrument that fits in the mouth out of sight. Cannot be detected. It is used in connection with the above, and with the aid of this wonderful DOUBLE THROAT, OR VENTRILO, you can imitate many kinds of birds, animals etc. Remember you get everything for ONLY TEN CENTS—a booklet giving you full instructions how to become a ventriloquist and throw your voice, also the Double Throat, or **Ventrilo,** the Original Bird Call **and** Prairie Whistle for giving imitations of birds and beasts, **etc.**

All Sent Postpaid **to** Any Address for Only **10c**

MAGICIAN'S BOX OF TRICKS

Apparatus and Directions for a Number of Mysterious Tricks, Enough for an Entire Evening's Entertainment............ $1.00



☛ **ANYONE CAN DO THEM**

It **is great fun mystifying** your **friends. Get this** Conjurer • **Cabinet,** and **you** will be the **cleverest fellow in your district.** It **contains** the **apparatus** for ten **first-class tricks,** *including* The MAGIC BALL AND VASE TRICK (a **wooden ball** *is* **placed inside,** and upon **replacing the** lid **has disappeared** and is found **in someone else's** pocket): The HINDOO TRICK CARDS **(can be made** to **change** completely no **less than five times);** DISAPPEARING COIN BOX (a coin, **placed** in the wooden **box, vanishes entirely** or **changes** into a coin of **another denomination);** The **GLASS** GOBLET TRICK **(a** coin is dropped into a **glass** of **water** and **when the water** is **poured out the coin has vanished and is found somewhere else);** the **RIBBON FACTORY FROM THE MOUTH TRICK (a seemingly endless supply of colored paper** ribbon out of your mouth); **the DISAPPEARING HANDKERCHIEF** (a **handkerchief** held **in the hand mysteriously vanishes);** the **WIZARD'S** RING COIN TRICK: the ENCHANTED [illegible] (no[illegible] **but** [illegible] **is able** to make it lay **down); the** GREAT HAT AND DICE TRICK (a large **dice is** placed on top of a hat. **disappears,** and is **found underneath yet no one has touched** the hat), and **last,** but **not least, the** GREAT PHANTOM CARD **TRICK,** or two **from five leaves nothing. Full instructions** are sent for **performing each** trick. In addition to the **above,** a number of other **feats and illusions** are fully **explained** for **which** you can **easily make** or **procure** the **necessary** apparatus. **Price** complete **$1.00** postpaid. JOHNSON SMITH & CO.

BOY ELECTRICIAN

Great Book for Boys, Students, Etc.—Only 10c Postpaid

The HOW and WHY of electricity fully told in simple language that any boy can understand. Scores of plans and instructions for making—dry batteries, dynamos, electric motors, telegraph apparatus, telephones, electric lights, electric door bells, alarms, electric engine, rheostat, mail box alarm, electro-magnets, automatic incandescent flash, electric shocking machine, wireless telegraph apparatus, induction coil, arc light, current reverser, etc., etc. Tells all about electric wiring, static electricity, magnets and magnetism, conductors and insulators, electrostatic induction, the electroscope, the electrophorus, condensers, the Leyden jar, dynamic electricity, the voltaic cell, electromagnets, electrolysis, electro-plating, electrotyping, etc. Also tells how to build a radio receiving set for a few cents. Nearly 100 illustrations. Sent postpaid to any address on receipt of ONLY 10c, coin or stamps.

MAGIC
MADE
EASY

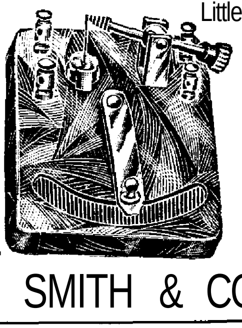
250 MAGIC TRICKS 10c

For Parlor or Stage

An excellent little book containing nearly 300 Tricks for parlor or stage. Tricks with cards, coins, handkerchiefs, eggs, rings, glasses, flowers, thimbles, spoons, bottles, string. Explains the mystery of the floating head and scores of other amazing feats of magic and illusions. Also Second Sight, Shadowgraphy, etc. So simple a child can perform them. Profusely illustrated. **ONLY 10c.**

125 CARD TRICKS and sleight of hand. Contains all the latest and best card tricks as performed by celebrated magicians, with exposure of card tricks used by professional gamblers. **Price 25c**

Little Wonder Crystal Radio Receiver $1



Say what you will about **Electrical** and Battery Sets, a CRYSTAL set has them all beat for simplicity and clearness of tone. There is absolutely no noise and no distortion—no batteries to buy—no tubes to wear out—no maintenance expense whatsoever. Cost nothing to operate and will last indefinitely. Reception is loud and clear. This Receiver is guaranteed to work equal to the most expensive Crystal Set you can buy. Has a receiving radius of over 25 miles, or under favorable conditions up to 100 miles. Constructed of the finest materials throughout, including supersensitive crystal, assuring quick results. PRICE of Receiver only **$1.00** postpaid. Or complete with Ear Phone and Aerial Kit—everything all complete—nothing more to buy, **$2.95** postpaid.

JOHNSON SMITH & CO. **Dept. 919** Racine, Wis.

Genuine
UNDERWOOD
Below ½ Mfg's. Original PRICE
(Refinished)

New Low Price! Now Only
Regular $102.50 Model $39.90 Cash
Easiest Terms Ever Offered

Famous
Model No. 5
NOW ONLY $1 DOWN

Think of it—over 2 million buyers paid $102.50 (cash) for this model No, 5 now offered direct-to-you at way below ½ original price—and on easiest terms besides. Positively the greatest bargain ever offered. Accept the special 10-day trial offer and be convinced. See the neat, perfect work it does—compare its bright, shiny newness without risk. Recognized as the *finest, strongest* typewriter built.

Easy Terms—only 10c a day

Here is positively the chance of a lifetime to own a World-famous Standard Underwood No, 5 completely refinished at the very lowest price and easiest terms. All complete with modern improvement? including standard 4-row keyboard, back spacer, automatic ribbon reverse, shift lock, 2-color ribbon, etc. Ideal for business and professional men—teachers, students, story writers, etc, Don't let this chance pass by,

Learn Touch Typewriting

Learn touch typewriting free! Complete (home study) course of famous Van Sant System given with this offer. Fully illustrated—easily learned.

10 Day Trial

You save over $60 by quick action. These genuine guaranteed Underwoods now only $39.90 (cash) while limited supply lasts. Only $1 down brings the Underwood for 10 days' trial. If you keep it—only 10c a day soon pays for your Underwood on our new low price and easiest terms. Send at once before this special offer is withdrawn. Remember every machine fully guaranteed and sent on 10 day trial.

International Typewriter Exchange 5
231 W. Monroe St., Chicago. Dept. 305
I enclose $1 deposit. Send Underwood No, 5 (F.O.B. Chicago) at once for 10 days' trial. If I am not perfectly satisfied I can return it express collect and get my deposit back. If I keep it I will pay $3 a month until I have paid $44.90 (term price) in full.

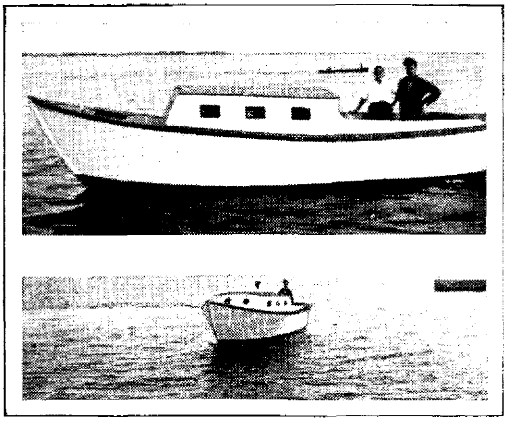
Name .... Age......

Address ....

Town .... State...............

ANDY'S SHOP MAIL BOX

(Continued from page 23)



Earl Keates, of Kingston, Ontario, (stopping place for Canada's wild geese) has built one of Hanna's "Dorothys." Isn't she a nice looking, able sort of boat? Star four power.

Kingston, Ont.

Dear Sir:

Launching Dorothy was a very simple matter as you will see by the pix. We just blocked her up high enough to allow an old car chassis which we borrowed from an auto wrecker to be backed under her, rigged up a tow bar blocked and tied her on securely, hooked it to the back of a car and we were away. It towed along at twelve or fifteen M.P.H. without any trouble. A good place was selected at the lake shore and all we had to do was back the trailer out into the water as far as possible by

(Continued on page 28)

BUILD A FRONT DRIVE!

The details of construction of a REAL BABY FRONT WHEEL DRIVE AUTO as this are now in blue print and available to you. Known as the "Silver Bullet," this car powered by a 4-cyl. motor and equipped with 4-wheel brakes, is made of old car parts as Model T, etc., all so cheaply obtained now, and best of all a machine shop is not a necessity for making such a Fast one Data on using 2-cyl. motorcycle motors is also included. Send stamp for furthur details and immediate reply. EDW. A. BORNTRAEGER, 3450 N. Marshfield Ave., Chicago, Ill.

$10.00 A MONTH
for an 8" Swing
BACK GEARED
SCREW CUTTING
PRECISION
LATHE
Wt. 225 lbs.

Supplied with cither Countershaft or Motor Drive. Also few Rebuilt Lathes, 9" to 18". Easy Terms. Write for Lists.
SOUTH BEND LATHE WORKS 520 E. Madison St.. South Bend. Ind.

No JOKE To BE DEAF

—EVERY DEAF PERSON KNOWS THAT George P. Way made himself hear, alter being deaf for 25 years, with Artificial Ear Drums—his own invention. He wore them day and night. They stopped head noises and ringing ears. They are invisible and perfectly comfortable. No one sees them. Write for his true story, "How I Got Deaf and Made Myself Hear." Also booklet on Deafness. Address

Artificial Ear Drum

George P. Way, Inc., 741 Hofmann Building, Detroit, Michigan

—because he couldn't entertain

ARE you, too, ruled out, barred from parties and popularity? You are probably just as attractive, interesting, clever as any one else. Yet others always capture all the good times while you alone are left out in the cold.

Why? Find out, why and the bars that shut you out will fade away and disappear. Most people who miss popularity are themselves to blame. Friends would invite you out if only you had something to add to the general gaiety. For that is why we have parties . . . to entertain each other.

And yet, so many think ability to entertain is a special talent. If you mention music (the greatest single factor in popularity) they say I can never learn to play. I'll need a private teacher. It will cost so much, and take so long. No, not for me."

They remain barred outsiders because they don't realize that no one need be a musical genius to learn to play . . . that thousands have acquired a musical education without teachers, tremendous expense, tedious practicing and boring scales.

Forget Theories—Do What 600,000 Others Have Done

Already, over six hundred thousand men and women have chosen this new method of learning music, many just as discouraged as you now. And every single one of them chose this method of learning to play their favorite instrument.

Most started towards popularity by coming across such an advertisement as this. At first they may have doubted that a way had been found to make learning to play easy and inexpensive instead of boring and costly.

But all proved to their own satisfaction that they could learn to play at home, **without** a teacher, in half the usual time, and *at a cost of only a few cents a day!*

Make up your mind to read this offer through. Take advantage of the opportunity it brings you, yet place yourself under no obligation . . . the offer that convinced over six hundred thousand that the U. S. School of Music Method was the ideal way to learn to play.

Pick Your Instrument

- Piano
- Organ
- Ukulele
- Cornet
- Trombone
- Piccolo
- Guitar
- **'Cello**
- **Mandolin**
- Harp
- Saxophone
- **Flute**
- Clarinet
- Violin
- Hawaiian Steel Guitar
- Sight Singing
- **Voice** and Speech **Culture**
- Drums and Traps
- Automatic Finger Control
- Banjo (Plectrum, 5-String or **Tenor**)
- Piano Accordion
- Italian and German Accordion
- **Harmony** and **Composition**
- Juniors' Piano Course

Send for Free Booklet And Demonstration Lesson

The U. S. School of Music will send you a complete, explanatory booklet and a Free Demonstration Lesson. All you promise is to read through both book and lesson—thoroughly. Nothing more, because once you see this booklet, you will be convinced that you, too, can learn to play your favorite instrument. You won't have to be urged. You will urge us to hurry your first lessons to you.

That's a fair offer, isn't it? You have to be satisfied before you begin.

If you want popularity, if you would like to be able to entertain and surprise your friends, to make real music—jazz or classical—roll from your finger tips the minute you sit down to play—ACT NOW! Mail this coupon today! No obligation. Instruments supplied when needed, cash or credit. U. S. School of Music, 2623 Brunswick Building, New York City.

U. S. SCHOOL OF MUSIC
2623 Brunswick Bldg., New York City

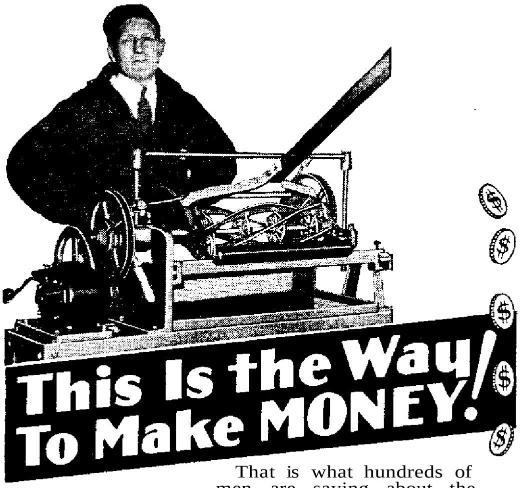
Please send me your free book, "How You Can Master Music in Your own Home," with inspiring message by Dr. Frank Crane, Free Demonstration Lesson and particulars of your easy payment plan. I am interested in the following course:

........................Have You Instrument?..........

Name..

Address...

City............................State..........



That is what hundreds of men are saying about the Foley Electrakeen Lawn Mower Sharpener business they have started. Last year Woodmancy earned $25 to $30 a day. Morse earned $1520 in five months.

Start Your Own **Cash Business** at Home Now

There is no other method for sharpening lawn mowers to compare with the Foley. You can turn out perfect work quickly and easily. Simply put the lawn mower in the machine and turn on the power—the Foley Electrakeen System automatically sharpens ALL blades at once.

Foley Eleotrakeen Lawn Mower Sharpener

Uses same system as the leading lawn mower factories. Sharpens all sizes and types of lawn mowers. Costs you only 1c a job and you get $1.00 to $1.50. New attachment also grinds axes, hatchets, knives, etc. Walter Dambek writes, "In three weeks I made enough money to pay for the machine and all expenses. . . ."

Big Profits Can Be Earned

There is plenty of business waiting for you. People would rather have their lawn mowers sharpened the Foley way because they cut better and stay sharp longer. YOU can start this business in spare time and make BIG MONEY! Small investment—easy monthly payments—Spring will soon be here—There will be lots of business for you—Send coupon or postcard today—no salesman will call.

Send for Complete Information *Today*

Foley **Manufacturing** Co.
306-3 Foley **Bldg., 11** Main St. N. E., **Minneapolis, Minn.**

Tell me how I can start my own Cash Business and make Big Profits with the Poley Electrakeen Lawn Mower Sharpener.

Name ....

Address ....

City .... State ....

ANDY'S SHOP MAIL BOX

(Continued from page 26)

Alvin Sletterdahl takes his own picture on his Mead glider. What with flying the ship, picking a lauding spot and snapping this, he's some busy!

hand and then hook on with a power boat and pull the trailer out until Dorothy was afloat which wasn't very far, believe me. This was August 1st, and she took in such a little water that it was not necessary to remove any for two or three days, and by the end of Aug. she would not make over two pails full a week. At first we used bags of sand to hold her down but as soon as we found out where the weight was required we secured some old iron grate-bars under the floor. She is powered with a Star four motor and runs at a lively clip, behaves well in a storm and is a nice looking boat all the way through, but I did not like the sail plan so I left the sail off for now. Mr. Hanna has told me about a new sail plan and I think I will add this one which will make I think, the nicest little all-'round craft afloat. Any person who really wants a nice sensible boat at a small cost can make no mistake by starting right now to build Dorothy in order to have every detail ready for the fine days next spring, when you should be sailing instead of building like we were forced to do on account of not starting soon enough. But are we proud now. Oh, Boy!

Yours truly,
Earl Keates.

(Continued on page 30)

11 ALLURING BEAUTY NEEDS
All Full Sized Vivian-Vance Creations

98*
PLUS POSTAGE
COMPLETE
Vivian Vance
LILAC WATER
SHAMPOO
FACE POWDER
NAIL POLISH
FACE LOTION
CLEANSING CREAM
LILAC WATER
Regularly priced at $1.00. This exquisite achievement produces a unique, mysterious, fascinating odor.
SHAMPOO
Regularly priced $1.00. A genuine cocoanut oil shampoo, enhanced by the modernistic bottle to beautify your boudoir.
VANISHING CREAM
Regularly priced $1.00 a jar. A magical beautifier and skin cleanser.
BRILLIANTINE
Regularly priced at 50c. The hair is woman's crowning glory. Just what you need to give your hair that natural-looking lustre and glossy effect.
FACE POWDER
Regularly priced $1.00. The mastery and uncanny craftsmanship of our chemists is emphasized in the presentation of this new, soft, satisfying face powder.
FACE LOTION
Regularly priced at 50c. Excellent for protecting skin and keeping it soft. Refreshing for make-up.
PARFUM BOUQUET
NAIL POLISH
Regularly priced 50c. You'll rave over this extraordinary nail polish.
GARDENIA PERFUME
Regularly priced $2.00. The exotic fragrance and fascination of this entrancing perfume will delight you.
LIP ROUGE
Regularly priced 50c. Packed in liberal sized jar, to be used for either lips or face.

$11.50 WORTH OF TOILET REQUISITES 98¢ PLUS POSTAGE

Each and every item is of selected ingredients. Guaranteed to be pure. The VIVIAN VANCE name stands for quality. Each and every package is full size as advertised. Most any item included in this sensational combination of 11 pieces alone costs what we ask for the eleven alluring beauty needs offered here.

This is a get-acquainted offer. We want to make new friends. We want you to try our products at a bargain price and be convinced that the VIVIAN VANCE preparations are the ones you should always use.

Your Guarantee

Each article is guaranteed as represented and to please or you may return purchase and we will refund your money.

SEND NO MONEY

IF YOU DO NOT CARE TO DESTROY MAGAZINE SEND YOUR ORDER ON PLAIN PAPER or drop coupon in envelope and mail to us. Your package containing the 11 alluring beauty needs will be sent by return mail. Pay postman 98c, plus postage. Clip coupon today—NOW.

PREFERRED TOILETRIES, Inc., Suite 703 150 Nassau St. New York, N. Y.

PREFERRED TOILETRIES, Inc., 703
150 Nassau Street, New York, N. Y.

Send the 11 packages containing regular full size Vivian Vance beauty needs. Upon arrival I will pay postman 98c, plus postage. I can return and get money back if not satisfied.

Name ....

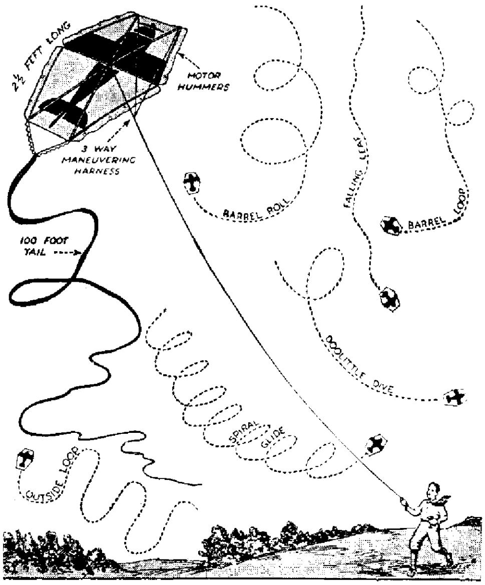
Street ....

City .... **State** ....

Shade of Face Powder ....

Orders from Canada and foreign countries must contain M. O. for $1.50.

AIRPLANE KITE
Loops, *Stunts*
Zooms, *Dives*



By jerking on the string at proper intervals this big kite is made to do any stunt a good pilot can do. This shows only a few. Note the 100-foot tail. Kite comes complete in big box, ready to fly.

This Big Kite Complete *only* 49¢

Here's the biggest man's size thrill in kite flying ever to take the air! Open the big box we send you and get the thrill of your life. The airplane kite with roaring motor comes to you ready to fly. String aplenty is included. Box 15 x 23 inches.

Ready to Fly with 100-foot Tail!

Get the feel of flying a fighting plane! The 100-foot tail holds the secret of this stunter's amazing ability to imitate every airplane maneuver. Directions with each kite.

Send 49c Today!
(Stamps or Coin)

and by return mail we'll shoot you this unusual kite bargain.

AIRPLANE KITE CO.
529 South Seventh Street
Minneapolis Minnesota

ANDY'S SHOP MAIL BOX

(Continued from page 28)

Score 1 for Mead Gliders! Here's a good letter from a chap who built one. Just because we didn't design it or publish the plans is no bar to running it—the effort and enterprise and fun resulting are the main issues.

Wood Lake, Minn.

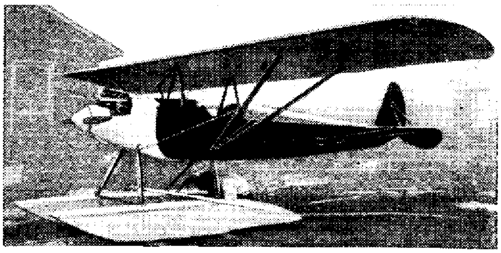
Gentlemen:

I am enclosing a few snapshots of ourselves and our Mead Glider which we built from *a* construction kit.

We have taught ourselves to fly it without a single mishap. We had no previous aeronautical experience, but can now make 360 degree turns and perfect landings.

This glider flies and controls beautifully, and you will note one picture is taken in the air (of myself) at about 300 ft. estimated altitude.

Yours very truly,
Alvin Slettedahl.



J. S. Baxter built this Heath. A good one she is, too

* * *

J. S. Baxter has the airplane itch, and well he may, for he sounds as though he were steeped in lore.

Sudbury, Ont., Canada.

Dear Sirs:

With your Mag. up here in the C.O. frame room and under discussion we have decided to build that short wave adapter, "but," darn the buts, you have designed it to shock the insides of a super het. I want to use it on a Philco Model 65 and that's no super het that I know of, so question No. 1 is, will it work on any set? Throw your — or + ballot in the stamped self-addressed enclosed.

And with that detail off my chest, let me say that your pack mag. is a pursuit job compared to some other allied types of mechanical magazines, and boys, here's a tip, lay down your shot guns, open up your peek proof windows, hand the white rag to Andy, even if he is in the other camp. His heart is pure dural and he's a head chock full of gears, springs and wheels and I am sure that about so chaste a little tin god there must be ever an exquisite aroma of hi-test gas, go take him fellows and put him in the ex-stn. where he belongs.

Me? Oh I have a shop which bears the singular name of the "dug out" (it is). There's the usual mess of tools and half built

ANDY'S SHOP MAIL BOX

[illegible] and a fairly good 16"x5' engine lathe, then I am the owner of a Heath Parasol with a Henderson conversion of my own, castings and all. Oh yes, I melt the dope up myself. Also, I play around with a motorcycle, pretty soon I'm going to have to paint the outside of the cylinder so I can go on reboring and casting new pistons, there are some other planes up here, a Church, Pietenpol and another Heath. And winter is the only practical time to play with them. Tried the pontoons on the Heath but wooden props and spray. I couldn't whittle them out fast enough. Like to take a crack at the twin, but always the same story up here, your prices on the castings are O.K. but lay on duty and shipping charges. Well, it can't be did.

And here's another question, you or somebody else said that a Heath Henderson prop should have 3'6" pitch, Heath's blue prints call for 2'6" approx., which I have been using. Now, darn it, what should give the best performance on that little mill, some one else said use a bigger prop and run it slower for better results. Heavens, maybe I have a good engine after all.

Well, good luck,

J. S. Baxter.

(Continued on page 34)

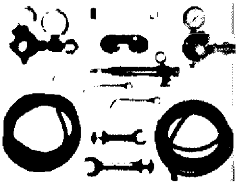
IT COSTS YOU NOTHING UNLESS
IT GROWS YOUR HAIR
Eliminates Dandruff...Stops Itching Scalp

JACK SLAVIN Before Treatments

We refund every cent of your money if you are not more than satisfied. Nothing to lose. "The Bald Spots are Covered with New Hair," writes E. I., among many others. Send NOW for FREE information in plain sealed envelope without any obligation.

JACK SLAVIN After Treatments

SLAVIN CO., Dept A-120
200 Post St San Francisco, Cal.


LEARN TO WELD AT HOME

We send your Complete Outfit with Greatest Course of Instruction ever offered. Get in business for yourself quickly. Steady work and big profits in fast-growing industry. Pay us weekly while you learn.

NEW ATTRACTIVE WINTER PRICE

Write now for full particulars.

Coleman Electrical School, 1672-X Main St., Kansas City, Mo.

AN EASY $5. A DAY

Profits with new magic invention that lights gas instantly without spark or flame. A sure sale everywhere gas is used. Retails for 25c.

MYSTERY GAS LIGHTER

Mail in on this BIG MONEY MAKER Act NOW

Packed on individual cards with instructions. Sample 10c. Rush $9 per gross or $1 per dozen.

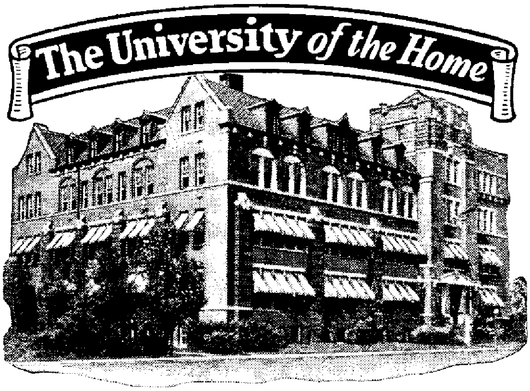
NEW METHOD MANUFACTURING CO,
New Method Bldg., Desk MG-3, BRADFORD, PA.

CARTOON YOUR WAY TO SUCCESS!

DON'T COPY - LEARN TO ORIGINATE!

DAVE BURNS will teach you HOW to CREATE ORIGINAL CARTOONS at home that you can SELL! Course has 26 lessons and 600 illustrations. Send name and address for free details. Only.... $2.85

DAVE BURNS SCHOOL, Dept F-S, Box 1194. CLEVELAND, OHIO



It's Cheaper to Get Specialized Training Than to Get Along Without It

U. S. Government statistics show that a man who has obtained specialized training in College or Engineering School **earns *$1,313 a year more*** than a High School graduate—or a total of $52,520 more during his working life of 40 years.

If you can't go to college, you must nevertheless get specialized training in order to compete for the better-paid jobs. So it's far cheaper to invest a small amount of time and money in a home-study course that will give you the necessary training, than to make no effort at self-improvement and be forced to take a job paying $1,313 less per year.

3 Best-Paid Lines

The greatest number of ***well-paid young people*** are found in Business—Drafting—or Electrical work. because these three big lines offer many opportunities to those having the ***specialized training*** necessary to hold responsible, well-paid positions.

Business & Accounting: Every concern keeping records or handling money employs Accountants.

Drafting & Design: Draftsmen constantly needed by Engineers, Architects, Manufacturing Plants.

Electrical Engineering: One of the livest, fastest growing industries, with frequent new opportunities for trained men.

Taught at Home by Experts

Our special texts were prepared by over 200 of the best-known Engineers, Business Executives, Educators, etc. Many used by resident colleges, trade schools, U. S. Navy, Province of Manitoba, Can., etc. School chartered 35 years ago as an educational institution, not for profit, like the best resident colleges. Registered in Illinois as professional correspondence school.

We can give you thorough, practical home training, largely of college standard, in the line most attractive to you. Next to a college education, American School training is best. Coupon will bring full information on line you prefer, and list of students and graduates in your locality,

American School
Dept. G-333, Drexel Ave. at 58th St., Chicago, Ill.

How can I qualify for well-paid position in line checked?

☐ Business ☐ Drafting ☐ Elec. Eng.

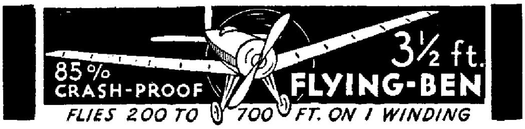
Name .... Age ....

Address ....

PLATE YOUR AUTOMOBILE

Faucets, Tools by new method. Our Plating Powders deposit a heavy plate without electricity; dispenses with polishing. Half pint can $1.50 prepaid. Free particulars.

GUNMETAL CO. Ave. S., **Decatur, Ill.**



Here's a real flying model, designed by aircraft engineers, made of new **CRASH-PROOF** material. No balsa or flimsy sticks. Crashes buildings, fences, trees, etc. without breaking. 200-lb. man can stand on wings. **New patented oiled rubber motor** whirls the 12in. prop. Comes complete ready to fly or in kite. Low prices. FREE! colored folder shows plane in flight and crashes. Write at once.

FLYING BEN MODEL AIRCRAFT CO.
2659 No. Parkside Ave. Dept. 12 CHICAGO, ILLINOIS

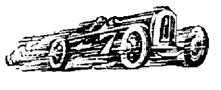
FINEST CHROME STEEL

Razor Blades

Unconditionally Guaranteed
For Gem and Gillette Razors
Seven for $.25, or Thirty for $1.00 Postpaid
Specify for which Razor

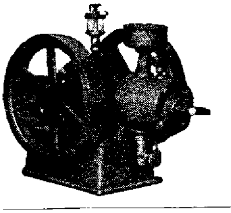
BARNETT SALES AGCY.
279 N. Em lid Ave. Pasadena, Calif.

Dirt Track Racing



Now you can break into the racing game. How to build your racer, contest rules, supercharges, balance, speed, "revs," compression ratios—a complete racing treatise illustrated. Postpaid $1.

RAY KUNS, Dept. A, Madisonville, Cincinnati, Ohio.



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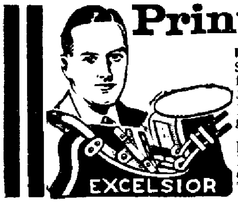

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See Page 96

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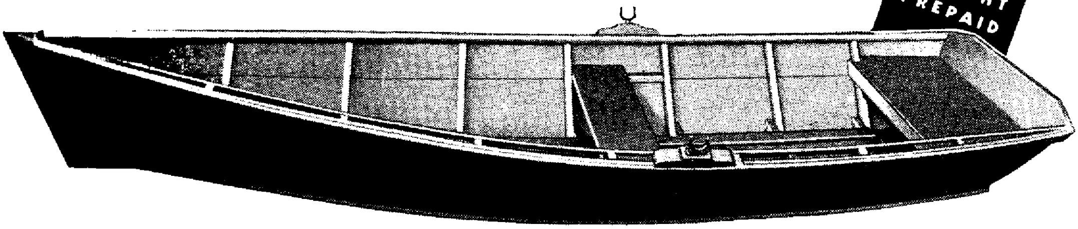

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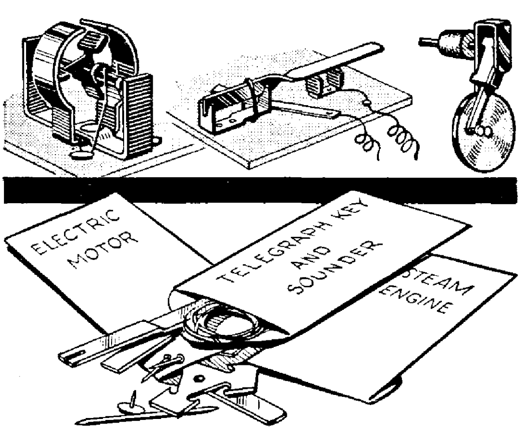

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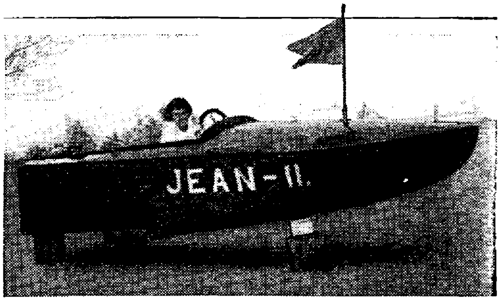
ANDY'S SHOP MAIL BOX

(Continued from page 31)



Jean was built by F. V. Burgess from plans of Miss Modern Mechanix, which appear in the new boat book "How to Build 20 Boats," published by MM.

That Boat Book mentioned off and on during the last few months has finally gathered itself a set of ribs, found a place to get itself built, and is doing nicely under the skilled hand of Westy Farmer, who is editing it. See elsewhere this issue for an ad announcing it. Apropos of boats comes this one describing a Miss Modern Mechanix hull:

> Dear Sirs:
>
> I am forwarding a couple of snaps which may be of interest. Also a fire protection device for automobiles. Speedboat is one which I built to drawings and instructions in one of your issues. A great deal of pleasure was derived in building this boat and it has been very satisfactory in rough water. Second picture is a snap of Dominion Coal Co.'s steamer, Walford, which was driven ashore in the gale we had some few weeks ago. This boat was only four years old. At low tide it is possible to see right under her. The first mate swam ashore with a light. He and the crew were taken off on a bosum chair on a line fastened to the trees on shore. One of the ship's officers was drowned. In this gale the wind at times reached a velocity of 80 m.p.h. and the waves came up over a 70-ft. bank or cliff.
>
> Car fuse I am forwarding for your patent expert's opinion. I have this device patented in Canada and United States. I have been an enthusiastic reader of M. M. since its inception. Will send you some more snaps later of models which I have built at odd times. Hoping these snaps will be of interest, I remain, yours truly,
>
> F. V. Burgess.

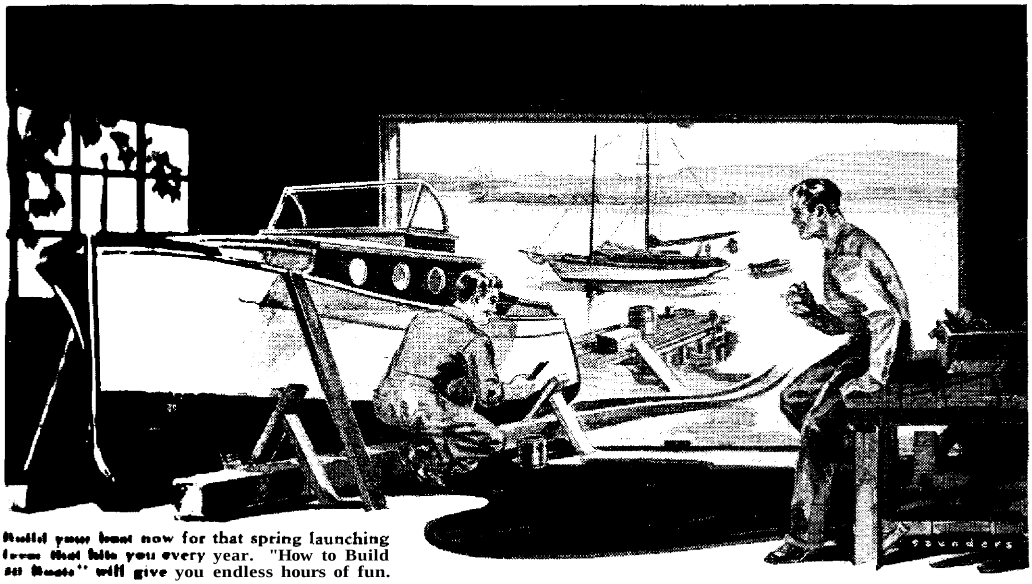
* * *

Here's something new in the way of winter sports—skiplaning.

Ralph J. Krasky, of Minneapolis, was manufacturing his own airplane and ran out of funds before he could attach the wings and running gear. Then a happy idea seized him, why not make a ski-o-plane out of it?

So substituting skiis for wheels, he tried out the home-made Pietenpol on ice and snow with excellent results. The machine is capable of making eighty miles an hour, he says, is easy to manage

(Continued on page 36)



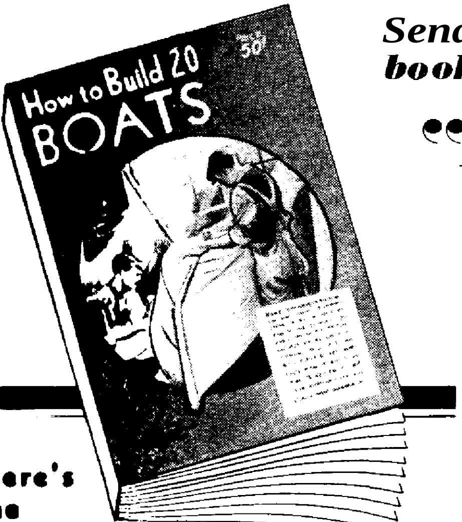
Build your boat now for that spring launching fever that bites you every year. "How to Build 20 Boats" will give you endless hours of fun.

Build Your Own Boat!

*Send for this new **144** page **book . . .***

"How To Build 20 Boats"

JUST OUT!



Here's the Book for ALL BOAT BUGS! ...

For that fireside or springtime boat fever there is no richer treat than this collection of famous boat designs—some of them hitherto unpublished. All have been tested in actual use; there are no "duds". Get your copy of this eagerly sought file of designs, sharpen up that pencil, grip that hammer and satisfy that old urge to build your own boat.

PARTIAL LIST OF CONTENTS:
[illegible] Ford powered cruiser—Dorothy, 24-foot sea-[illegible] outboard Buddy, a Rabl tabloid cruiser—Mayfay, [illegible] little raised deck cruiser—Wanderboat, a 16-foot [illegible] MI Boats, a 10-foot combination ice, sail and motor-[illegible] performing Ford A runabout—and [illegible], the designs for all kinds of boats.

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ANDY'S SHOP MAIL BOX

(Continued from page 34)

and is practically fool proof. The plane has proved itself practicable on a smooth surface, but because of the danger of encountering drifts, he is making a more decided curve to the front of the skiis.

* * *

And then here's something for the lightplane fans who like to contemplate the building of a motor.

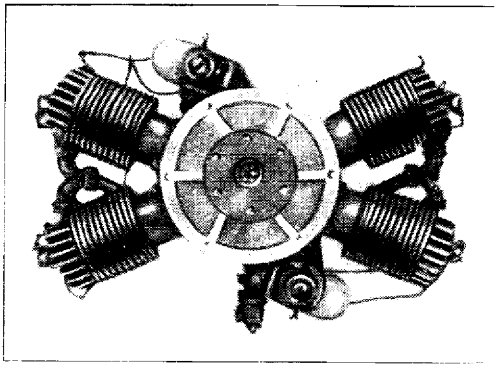
Al J. Lepsch, of 1515 So. 10th St., La Crosse, Wis., sends us a pic of a hybrid design which seems very well engineered and quite logical. He has grafted two motorcycle engines onto OIK crankcase, and informs us that the child is doing well, thank you. Here is what he says:

La Crosse, Wis.

Dear Andy:

Have been reading your mag. since the first issue was on the stands and must say that it sure is the best mag that I have ever read.

I built a Heath Parasol about four years ago and meant to send you some pictures of it but never got around to it, but now I've got something I think a lot of the readers would be interested in building.



This unusual motor is the product of the brains of A. Lepsch, of La Crosse, Wis.

Am enclosing a few snapshots of a four-cylinder radial motor that can be built at very small cost. It has practically no vibration. I had it mounted on a stand built of channel iron and standing on a cement floor and it never moved an inch when we opened the throttle. I haven't had a prop on it yet but we had a large brake drum on the shaft with which we started it.

Outside of two old Harley motors there isn't more than five dollars worth of material on this job. Either 61 or 74 cu. in. motors can be used. I used two 1920 model 61 cu. in. motors and the complete job as pictured with two mags and prop hub weighs about 140 pounds.

The photos show that I'm not much of a photographer but I hope you will be able to use them as I sure would like to see this in the "Shop Mail Box." Yours for more "how to builds."

Al. J. Lepsch.

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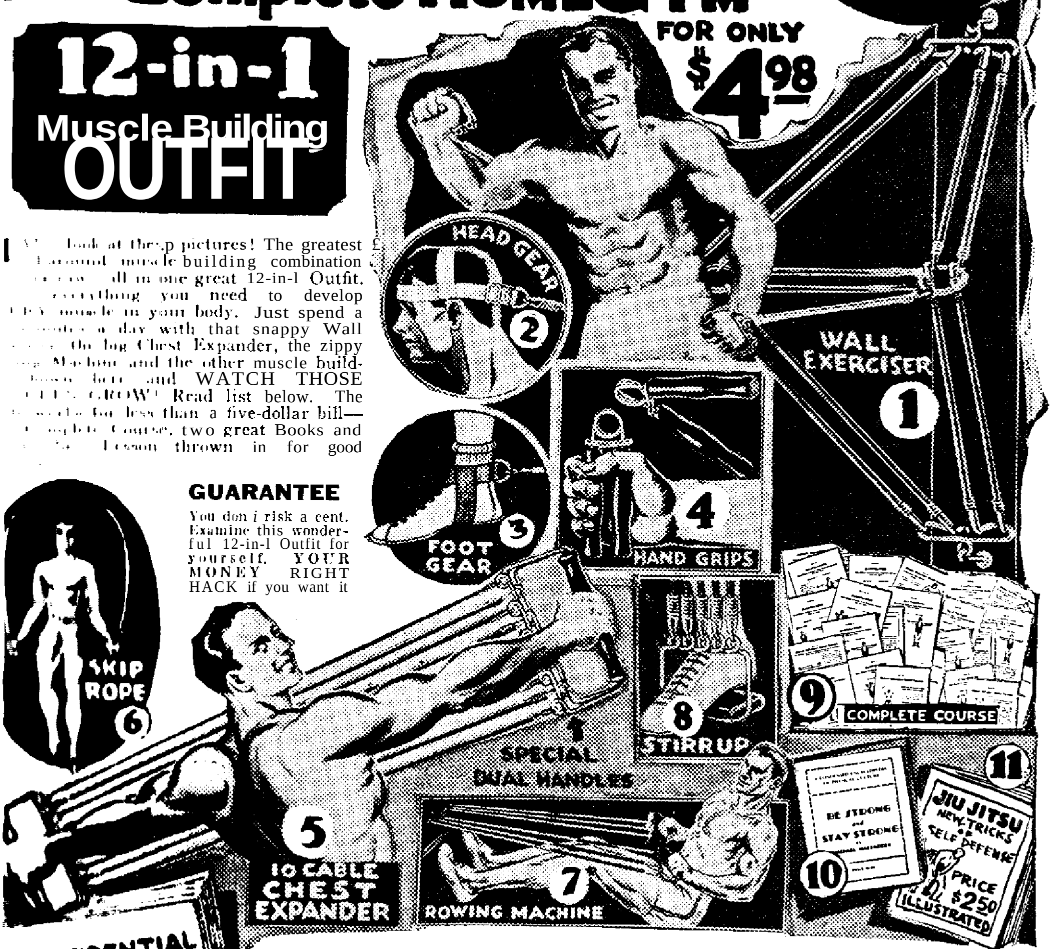
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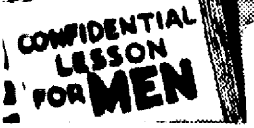
J[illegible] look at these pictures! The greatest [illegible] muscle building combination [illegible] all in one great 12-in-1 Outfit. Everything you need to develop [illegible] muscle in your body. Just spend a [illegible] a day with that snappy Wall [illegible] the big Chest Expander, the zippy [illegible] Machine and the other muscle build[illegible] and WATCH THOSE [illegible] GROW! Read list below. The [illegible] for less than a five-dollar bill—[illegible] Course, two great Books and [illegible] Lesson thrown in for good

GUARANTEE

You don't risk a cent. Examine this wonderful 12-in-1 Outfit for yourself. YOUR MONEY RIGHT BACK if you want it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[illegible] Adjustable Foot Gear for building muscular legs and thighs
[illegible] High Tension Grips build [illegible] and forearms
[illegible] Ten Cable Progressive Chest Expander (100 [illegible] the resistance)
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Just write name and address in coupon AT ONCE. Pay Postman only $4.98, plus actual postage on delivery. (Or send $4.98 and I pay postage.) Simply return outfit immediately if not pleased. Don't miss this wonderful bargain. Send TODAY. First come, first served.

Michael McFadden
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Michael McFadden,
55 East 11th street,

Dear Mike: Shoot me the works C. O. D. I'll pay $4.98, plus actual postage. My money back if I am not satisfied and return outfit immediately.

Name ....

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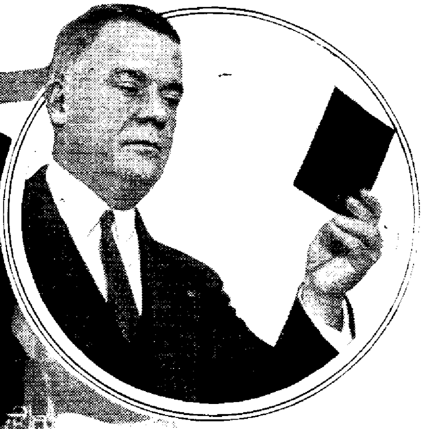
Town .... State....
Outside U. S. send cash with order.

TRACKING TOWN *the*

Detectives examining equipment of plant raided in Cleveland, O.



United States Attorney Howard W. Ameli, Nemesis of counterfeiters big and small.

Running down counterfeiters is the Secret Service man's toughest assignment because these outlaws are often as clever at mechanics as they are at crime. The relentless Nemesis of fake money makers tells how he pursues his quarry.

NUMBERS FOR RAISING BILLS
ROLLER

Ass't U. S. Attorney Thomas Arrowsmith examining confiscated equipment for raising $1 and $2 bills to 10's and 20's. Counterfeiters used paint remover to bleach figures off $1 bills, then printed on new figures, using numbers shown.

by HOWARD W. AMELI

United States Attorney

FAKE money is the product of the most despicable type of criminal. Even the underworld brethren of the counterfeiter look upon him with scorn because in their eyes his victims are usually the poor.

In my long career as government prosecutor for the eastern district of New York state I have never come upon a big-time jewel thief who included bogus money in his portfolio. Only the meanest criminal goes in for "queer." as spurious currency is called.

However, counterfeiting has been a lucrative avocation for the outlaw during the past decade. The American public has been gypped out of more than $50,000,000 by this form of banditry. Aside from the "easy-money" phase, which is fancied rather than real, this calling has very little to recommend itself. Hardly a train leaves New York bound for a federal penitentiary without its quota of counterfeiters.

Up until the circulation of the notorious B-277 counterfeit series, it was comparatively easy to detect "home-made" notes. There was always some imperfection, sometimes a grossly visible error in the imitation, to reveal the falseness of the bill.

In smashing the B-277 ring which had its base of operations in New York City, the government destroyed the most dangerous counterfeiting agency to be found in our records. Had these crooks been able to function in their nefarious work for another month, they would have succeeded in flooding the country with enough worthless paper to cause incalculable hardship.

e COUNTERFEITER

To Alan G. Straight, Chief of the New York Division of the Secret Service, belongs the credit of nipping this crew of money fakers. The technique of trailing the counterfeiters is an odd one, and perhaps seems mysterious and illogical to the layman. But I am going to tell about the inside movements here so that the general public might have a better understanding of how it is protected.

It was back in the early part of January, 1932, that my office first received a complaint on a phoney ten-dollar bill bearing the number B-27723486-A. In the ensuing days complaints continued to pour in and our alarm was great because we recognized the faithfulness of the reproduction as one which could be detected only by expert scrutiny. By the end of February we discovered that these bills were being "drifted" at the rate of $3,000 daily.

Near-perfect Bill Baffles Detectives

We held frequent and long conferences. There was no denying the fact that B-277 was a singularly perfect specimen. The veteran sleuths of the Secret Service declared themselves non-plussed at first. One definite conclusion was arrived at—that the B-277 job was the work of an expert, undoubtedly the master mind behind it had once been in the employ of the Bureau of Printing and Engraving in Washington, where the real thing is made.

Meanwhile the Secret Service Division of the Treasury Department issued a statement on April 30 in order to foil, as much as possible, the continued distribution of the bad bills. The statement bore the number B-27723486-A which is the first check and warning at its disposal. In this case where the rest of the note was so well done, the publication of the number was the most effective weapon.

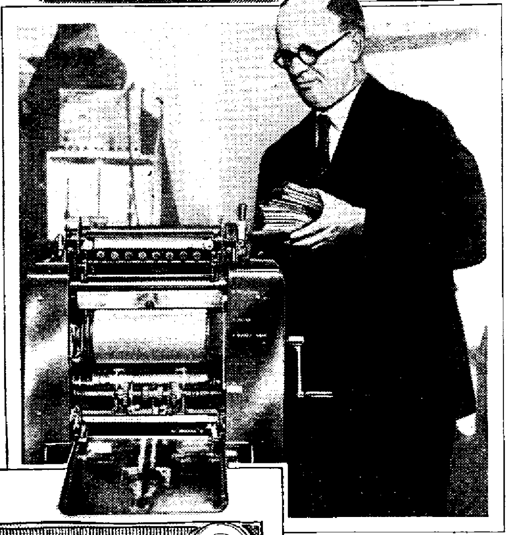
Government Warns Against Fake Money

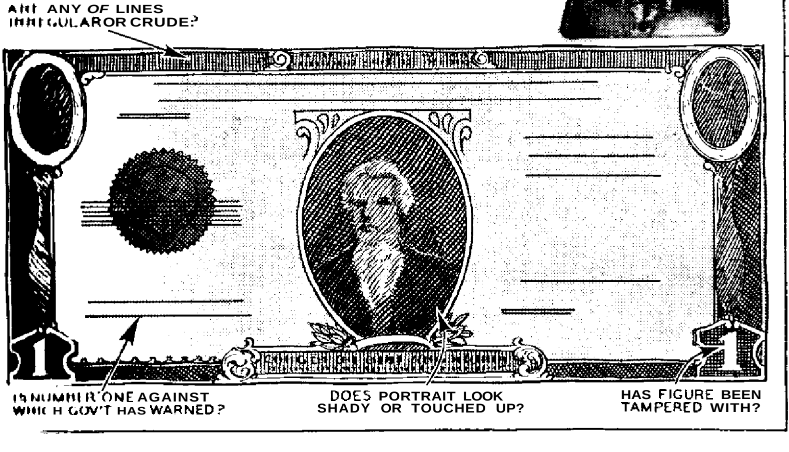
Still the complaints poured in. The government's diligence increased. Nothing was to be spared in trapping these counterfeiters. After careful analysis by federal examiners, this further word of caution was sent out from Washington:

"B-27723486-A. Ten-dollar Federal re-

Counterfeiting & Money Making Machine

Here's a counterfeit counterfeiting machine. When sheet of paper is inserted, the key is tapped and lo! out comes a bill that could deceive an expert, so makers say.




ARE ANY OF LINES IRREGULAR OR CRUDE?
IS NUMBER ONE AGAINST WHICH GOV'T HAS WARNED?
DOES PORTRAIT LOOK SHADY OR TOUCHED UP?
HAS FIGURE BEEN TAMPERED WITH?

Above photo shows the press employed by a New York counterfeit crime syndicate. The ring was exposed by the murder of a girl friend of one of the counterfeiters. Features to examine on a bill which you suspect of being counterfeit are illustrated at the left. For laymen, the most revealing feature is the number, which the government has warned against. Only experts can detect fake bills from imperfect engraving, as many counterfeiters are excellent artists and mechanics.

$100,000 Plant Turned Out $100,000 Fake Money Before It Got Caught

Here is a typical counterfeiter's press. Costing $10,000, the plant in which it is included turned out $100,000 in fake U. S. money.

Counterfeiting apparatus, along with $14,000 in fake bills, seized in St. Louis, Missouri. Bottles contain acids for etching steel plates.

serve note. On the Federal Reserve Bank of New York; series 1928 B; check letter "A"; face plate No. 19; back plate number indistinct; H. T. Tate, Treasurer of the United States; A. W. Mellon, Secretary of the Treasury; portrait of Hamilton.

"This is a deceptive counterfeit printed on one sheet of bond paper from photo-etched plates of good workmanship, the back of the note being especially dangerous. The face, however, is printed heavily in black throughout.

Portrait Features Found Imperfect

"In the portraiture, Hamilton's face has a drawn expression, the eyebrows being severely shaded and the lines forming the mouth and nose accentuating the details of these features. The parallel cross-hatch lines in the portrait background are barely visible due to heavy printing. The seal and numbering are executed in dull green, This counterfeit has been purposely discolored to create the appearance of age."

Beyond those flaws or means of identity, the government authorities were helpless. The unwary general public was not considered proficient enough to spy these B-277 bills except by their telltale number.

Mr. Straight and his men worked assiduously to run down the members of this ring. Their single bare clue was the undeniable fact that an expert who must have worked in the Mint at one time was the brains of the outfit.

Early in July Mr. Straight came into the possession of a business card used by Harry Mills, an engraver, of Providence, R. I. The card was placed under a microscope. It turned out to be the first clue after months of exhaustive work.

Counterfeiters must compete with the U. S. money plant, which has a distinct advantage where quantity of product is concerned. Stacks of bills shown here are being made ready for the clipping machine which cuts off and trims the edges.

Expert Engravers at U. S. Mint Work for Three Months on Bill Portraits

In the business of busting up counterfeit gangs we know that there are little odd peculiarities to engraving work just as there are to an individual's handwriting, the microscopic examination of the Mills card revealed the same little curlecues and clefts as were to be found in the counterfeit bills. The card condemned him beyond the shadow of a doubt. On July 29, he wrote out and signed a 32-page confession which put the agents on the trail of the ring.

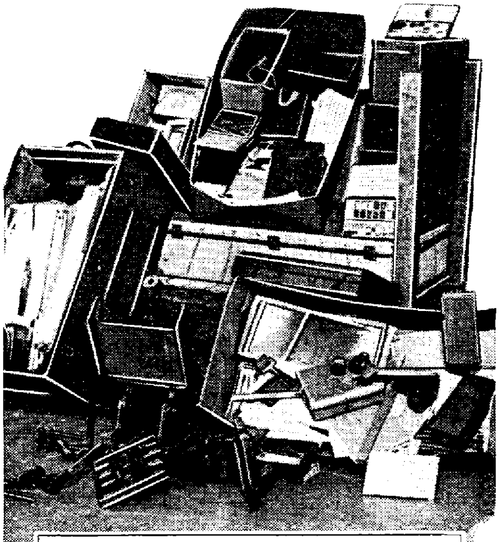
A very short time afterward the Secret Service men pounced on John Teal, a printer, who for many years had worked in the Bureau of Printing and Engraving. On Sept. 16 government agents swooped down on the Brooklyn residence of Mrs. Mary Woods where the much coveted plates were found in the cellar. That is the basic principle in the catechism of the counterfeit hunter—get the plates!

Counterfeit Rings Carefully Organized

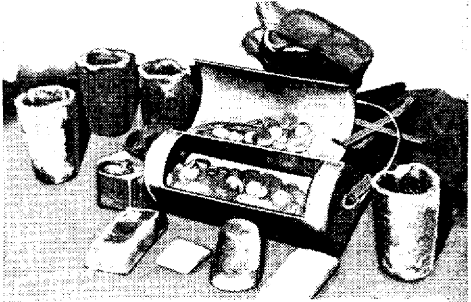
That is why the B-277 flotation continued even after the capture of Mills and Teal. Everything was in vain until the plates were seized. Mills got only $1,500 for making the plates. They were the first ever found in the possession of counterfeiters to be made of steel. They are usually made by photo-engraving.

In his confession Mills said that he spent three months, night and day, perfecting the counterfeit B-277. Teal, in his confession, told how his job was to handle the printing end of the business. Both men said that the leaders of the counterfeit mob blindfolded them whenever they were driven to the plant where the bills were made.

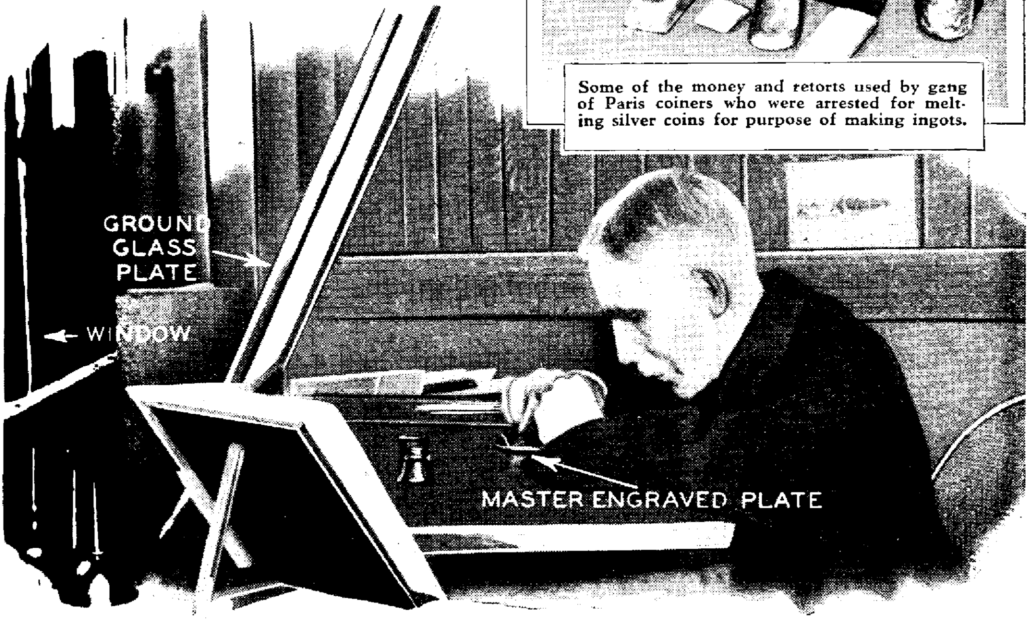
(Continued on page 135)



Timely seizure of the apparatus above by secret service men prevented the country from being flooded with $1,000,000 in bad money.

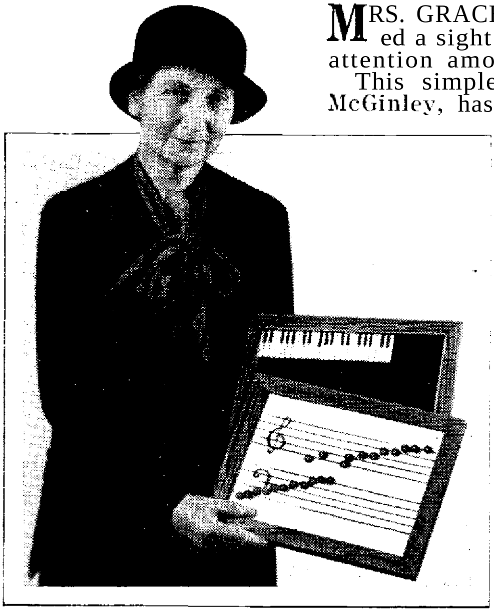


Some of the money and retorts used by gang of Paris coiners who were arrested for melting silver coins for purpose of making ingots.



Here is expert engraver at work at U. S. mint in turning out portrait which you see on dollar bills. Two to four months is required on the task. Suitable illumination is provided by ground glass plate which diffuses light over the plate.

Sight Reading Chart Makes Music Lesson Fascinating



Mrs. Grace McGinley holding the sight reading music chart she invented. The bass and treble clefs are formed by slender wires on which lettered buttons form the notes.

MRS. GRACE McGINLEY, Seattle music teacher, has invented a sight reading music chart which has attracted wide attention among music teachers and public school systems.

This simple, but graphic device as conceived by Mrs. McGinley, has the bass and treble clefs formed by slender wires, on which lettered buttons, designating the lines and spaces, can be moved about at will to form any desired chord. The chart is about the size of an old fashioned school slate as illustrated in the photo at the left.

To children, particularly, this chart has all the fascination of a new game and is used with equal success in teaching vocal and instrumental music.

After the pupil has been shown that "C" lives on C line, E on E line, etc., the lettered buttons are reversed to the blank side and a memory test given. When the pupil makes an error, the button is turned over to the printed side and without a word of criticism from the teacher, the pupil sees his own mistake.

The reverse side of the chart is a slate with a piano keyboard printed in the upper left hand corner.

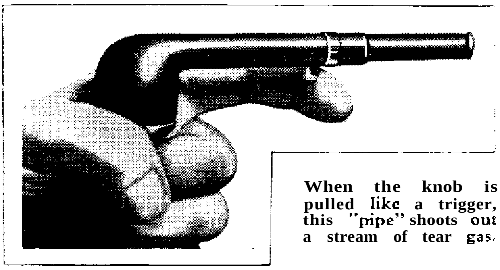
New Wheels for Giant Moguls

THE giant Moguls which ply the rails of the New York Central Line are enjoying another improvement in their efficiency in the form of double disc driving wheel centers.

This new type of wheel, shown in the photo below, consists of double disc centers over which are placed the ordinary locomotive tire. Engineers who originated the idea claim that this new type of wheel is cheaper than the old and is substantially lighter, thus reducing the impacts of the wheels on the rails. The greatest improvement, however, lies in the increase of strength.

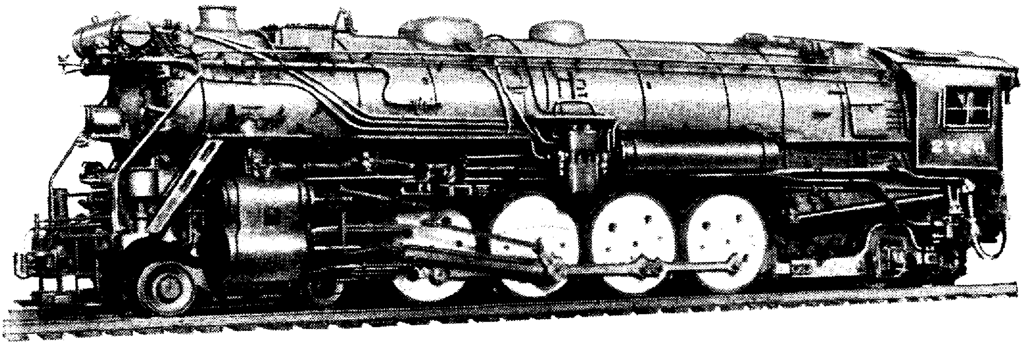
Other locomotives will be similarly equipped on the N. Y. C. when they are sent to the shops for repairs.

Pipe Is Effective Tear Gas Gun



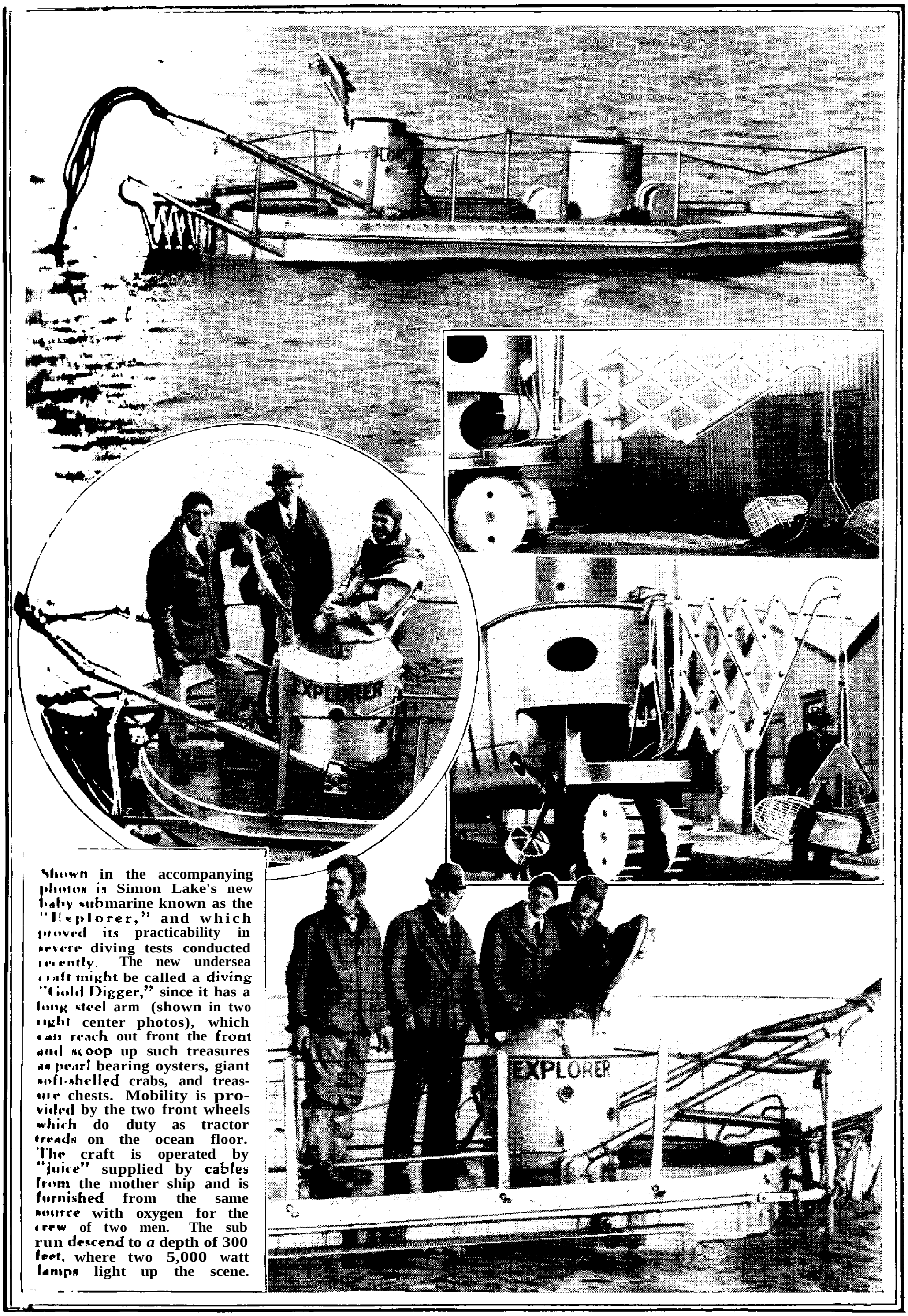
When the knob is pulled like a trigger, this "pipe" shoots out a stream of tear gas.

TEAR gas guns have taken many forms in the past and now the weapon comes out in the form of an innocent looking pipe, which no one could possibly suspect of evil purposes. Fortunately its shape permits it to be held like a pistol. The stem does duty as a barrel to spray the smoke in the culprit's face, while a small knob on the underside works as the trigger. The pipe may be carried in the same manner as its inoffensive brother. How it is held may be seen from the photo above.



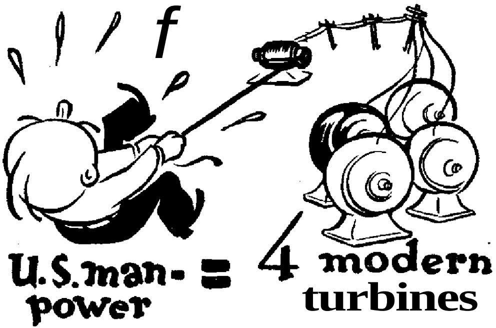
Double disc center driving wheel installed on N, Y. Central Moguls decreases weight and cost and increases strength.

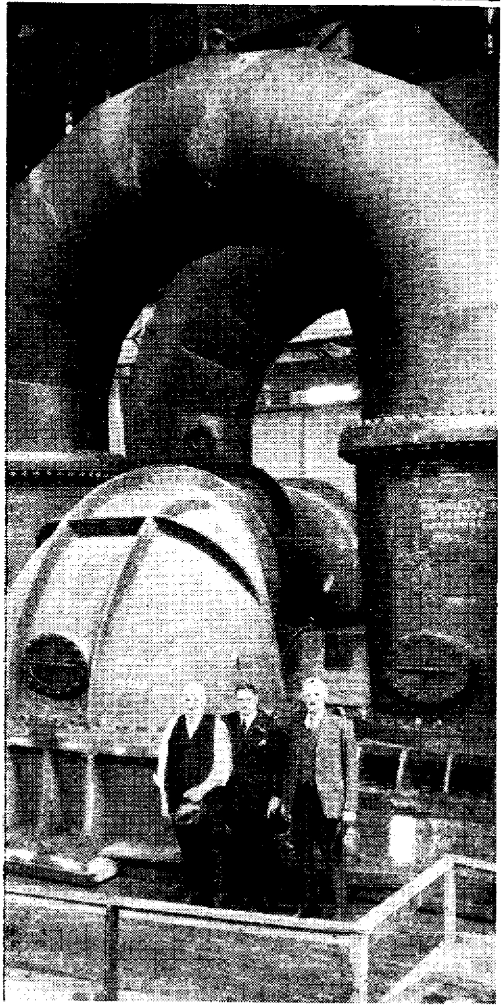
2-Man Crew Explore Sea Floor in Baby Sub



Shown in the accompanying photos is Simon Lake's new baby submarine known as the "Explorer," and which proved its practicability in severe diving tests conducted recently. The new undersea craft might be called a diving "Gold Digger," since it has a long steel arm (shown in two right center photos), which can reach out front the front and scoop up such treasures as pearl bearing oysters, giant soft-shelled crabs, and treasure chests. Mobility is provided by the two front wheels which do duty as tractor treads on the ocean floor. The craft is operated by "juice" supplied by cables from the mother ship and is furnished from the same source with oxygen for the crew of two men. The sub can descend to a depth of 300 feet, where two 5,000 watt lamps light up the scene.

TECHNOCRACY—*Gospel of the*





Four modern turbines like that above, of 300,000 kilowatt hour capacity, generate as much power as is produced by every adult worker in the United States! Technocracy would have world currencies based on this energy output rather than on gold, which it claims was effective as a standard only as long as civilization was based on man power.

What is Technocracy? This potent word, descriptive of a new social order based on the machine, has caught the popular fancy with an enthusiasm unduplicated since the early days of Karl Marx. But not many people understand what Technocracy is all about; this article is an easily understandable summary.

TWENTY thousand dollars a year income for everyone! Sounds fascinating, doesn't it—but just a little bit like a pipe dream? That's probably your first reaction, but let's probe deeper into the reasons why Technocracy, the word that is on everyone's lips today as the solution to our economic problems, dares to hold out such a glittering promise.

First, what is Technocracy and where did it come from? Its chief spokesman is Howard Scott, head of a group of technicians with headquarters at Columbia University, working under the impressive scientific title of the Energy Survey of North America. It has been functioning since 1920, but only recently have its findings been made public by Mr. Scott and others, and the backwash of depression in which we are caught up made the announcements of timely interest.

The Creed of Technocracy

Technocracy believes that we have been developing machines at such a rapid pace that within a few years so many men will have been discharged from their jobs that the few remaining workers will be unable to support the unemployed by charity, and the masses will rise in revolt to take by force the necessities of life which they are no longer able to earn by their own efforts.

An endless list of instances in support of their theories could be cited—the talkies threw thousands of theater musicians out of employment; automatic telephones displace operators; adding machines take the place of thousands of bookkeepers; electric turbines replace man power as the energy source for all kinds of work—in fact, machines have already replaced man to such an incredible extent that the output of four modern turbine-generators of 300,000 kilowatt capacity equals the *total amount of energy produced by every adult worker in the United States!*

But Technocracy would not condemn the machine for these reasons. It is, in fact, heartily in favor of the machine, seeing no good reason why the backbreaking work of the world should not be performed by metal men. Technocracy would simply substitute a new economic system of measuring money, which can be briefly described as *energy valuation.*

MACHINE

Everyone is capable of expending energy, whether by brainwork or manual labor. Under the present system, we exchange this output of energy for dollars, and if no one requires our energy we do not receive dollars to spend for our living.

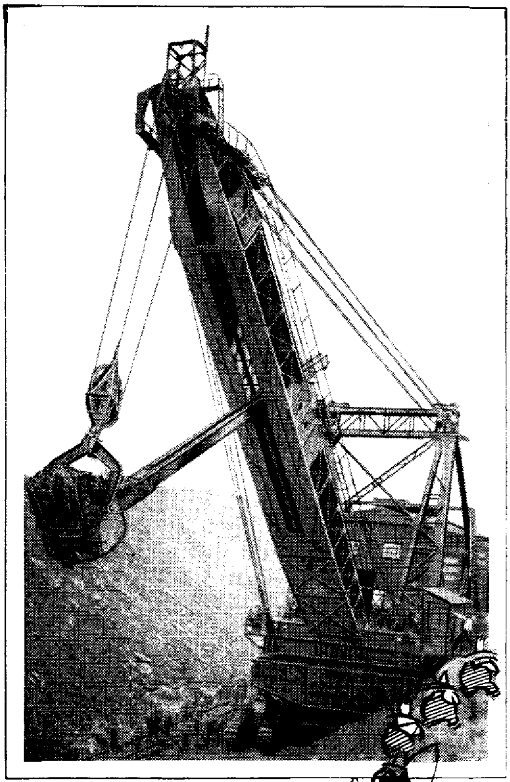
Instead, then, of obtaining dollars, Technocrats propose that energy be exchanged for certificates and that all work be divided so that each person has an opportunity to expend energy and obtain certificates entitling him to a share of the country's wealth.

Figures compiled by the Technocrats indicate that, if all the labor saving machinery in the country were used, the work to be done could be divided up so that if every man labored a little more than 600 hours a year for 20 years, his efforts would entitle him to an income of approximately 820,000 a year!

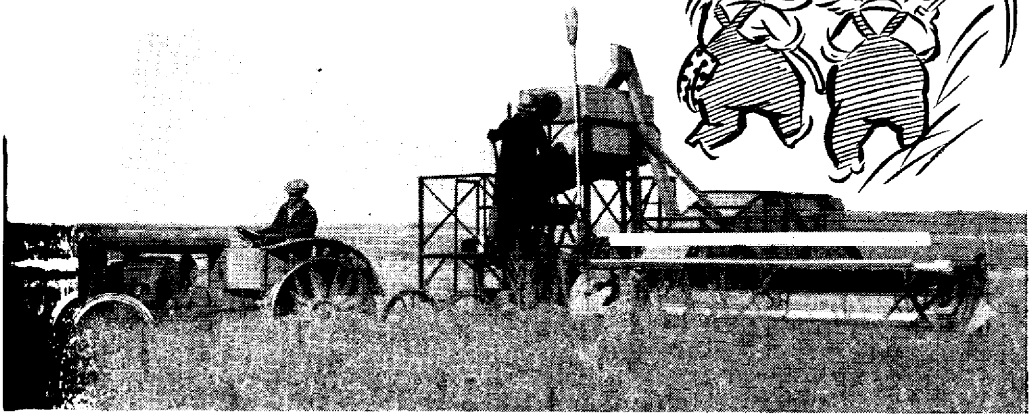
While no method has been worked out in detail as a substitute for our present money and price system, Technocracy's principal suggestion covering this ground is that energy certificates be used. These certificates would be the same as money, but would be of no value to anyone other than the man whose energy earned the certificates—and thus there would be no point in a bandit's holding up a man, since whatever certificates he stole from his victim would be useless to him.

Moreover, the certificates would be good for but a limited length of time, and if not spent in a month or two would become valueless, automatically doing away with the hoarding instinct.

Many problems still confront Technocracy but in spite of critics, the theory has won a wide popular following, and no man who respects the power of an idea can dismiss it as a fad of no significance.



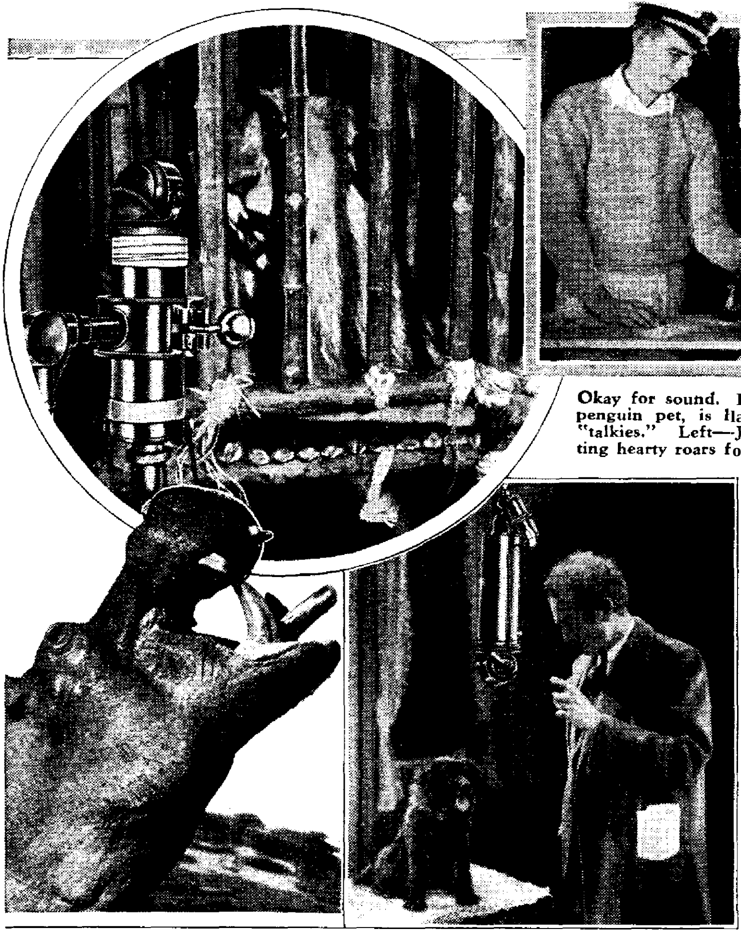
Countless instances in which the machine has displaced man power, throwing workers out of jobs, are cited by Technocrats as reasons why our economic order must be revised to avoid collapse. The gigantic shovel above, biting out 20 tons at a time, displaces a thousand men with hand shovels.



Tractor-drawn combines which cut wheat, thresh it and sack it for delivery have consigned a host of millions of "hired hands" to oblivion. In other days a man could always earn his primary necessities of food, shelter and clothing by the sweat of his brow during harvest time. The farmer who still depends on man-power must sell his crop in competition with low-cost machines.

Animals TRICKED Into

Okay for sound. Here, Oscar, Hollywood's famous penguin pet, is having his voice recorded for the "talkies." Left—Jackie, trained lion actor, emitting hearty roars for the "mike" in front of his cage.



Left—This hippo refused to talk for the "mike" till a shot was fired in his face. Then he let out a bellow that made talkie history. Right—Prospective dog actor being given a voice test. Only deep throated animal voices record well, higher pitched ones being unsuitable.

You can't always believe what you hear from the talkie screen. One animal in a scene may be acting while another is doing the "speaking." And human actors may seem in imminent danger of being eaten up alive, when they are really well out of harm's way! This article takes you behind the scene and explains the tricks of sound cameramen.

by CHARLES MURPHY

Famous Hollywood Animal Trainer

THE most vicious, blood-curdling animal sounds you hear on the screen enter microphones because animals are children —no more and no less.

In my nearly 20 years of training and directing jungle animals—from tiny monkeys through middle-sized leopards to the largest elephants—I have learned they react to the same treatment and in the same way as do children.

Withhold their food, and they roar. Tease them, and they spit back. Treat them gently and (at least figuratively) they purr.

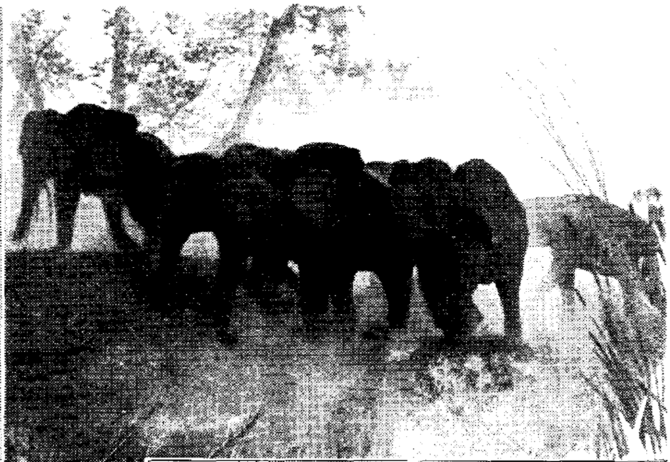
True, many are treacherous. I would not today walk among a den of lions without some means of protection. Cameras record the more vicious animals from behind wire cages. But in coaxing animals of all types, sizes and kinds to "talk" for the screen, I have had some amusing experiences.

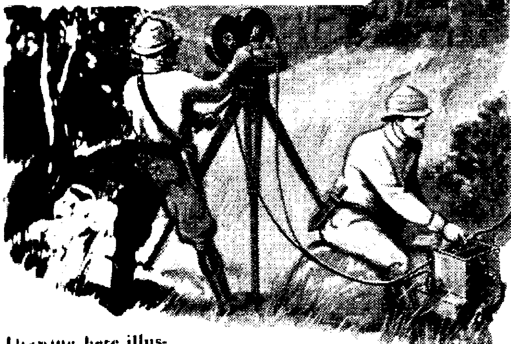
No sound that reaches out among a theatre audience is "surer fire" than that which comes from a deep-throated animal. Nor is any more difficult to catch. The mechanics of it offer enough troubles, and when you add to that the unknown quantity of an untrained beast roving more or less at will around an enclosure, hiding behind bushes or leaping from tree to tree, the difficulties are multiplied many fold.

Bears may look friendly, but no more difficult animal to direct ever walked into a scene. Bears and hyenas are treacherous, even obnoxious. Oddly, a bear can move

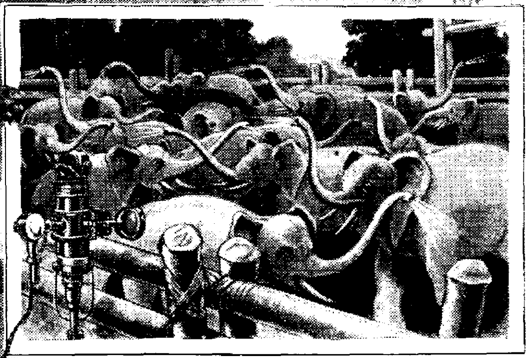
TALKING for MOVIES

Here is Charles Murphy, Hollywood's leading trainer. Each animal, before it goes before the camera, is put through a series of rehearsals lasting several months.





Drawing here illustrates how cameramen filmed stampede, then synchronized action with trumpetings.



Animals sometimes act but refuse to talk. When Hollywood jungle picture was filmed recently, the elephants stampeded as per schedule, but refused to trumpet. Problem was solved by recording trumpets of elephants in stockade and synchronizing the sound with the pictures.

faster than a lion and when he forsakes his "lines" and turns away from the microphone on an actor, he not only will bite, [ml he also will hug and scratch.

Even a pig, while not vicious, offers great difficulty to film with sound. In one recent picture the director wanted a scene showing an actor, glued in the saddle because he was having his first horseback ride, thrown to the ground, with the saddle sticking to his pants. Then a pig was scheduled to run between the actor's legs, lift him up and carry him away.

The pig grunted and squealed plenty, and he ran all over the lot; everywhere except between the actor's legs. While plenty of amusing squeals were "canned," the only picture obtained shows the frantic little animal dashing across the set. Some day the grunts will be valuable to add to some scene showing another pig performing a similar bit, but refusing to utter a sound!

Being child-like, animals look to their trainers for food, water, peace and sleep. We usher them into the world, raise them to maturity, rehearse them daily in various kinds of "business" for years, then send them through their paces for the movies.

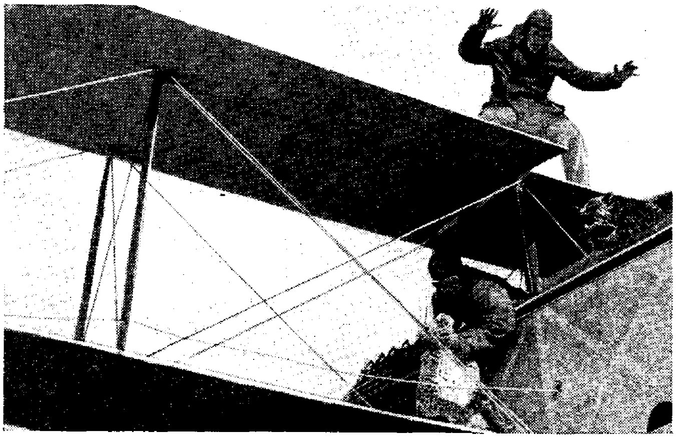
Perforce, pictures involving the use of wild animals are made within enclosures where they can be caught easily in case they wander out of the scene. Ordinarily they appear in brief sequences, running between two points or merely posing. Occasionally they clash or tear up a dummy. At such times their deep growls are real expressions of primitive dispositions.

Recently Jackie, a trained lion, jumped from a tree onto the shoulders of Melvin Coontz, a trainer made up to look like an African native. Coontz walked slowly down a jungle trail as Jackie watched him from above.

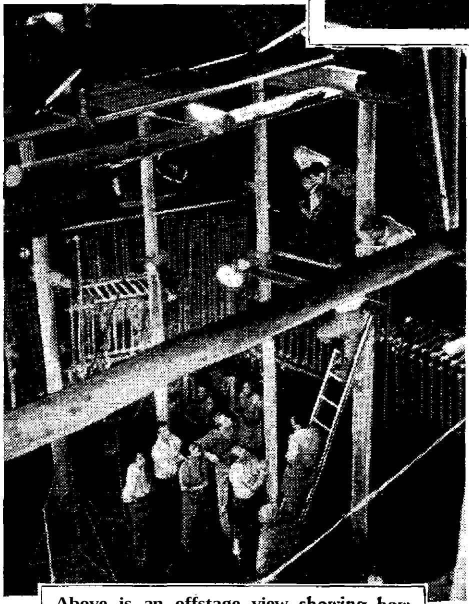
As the trainer reached the spot, he raised one arm, as though to thrust aside a branch. For years Jackie has responded to this sign by leaping on this trainer with a roaring

Trainers Double for Actors, Giving Cues to Beasts With Arms, Hands

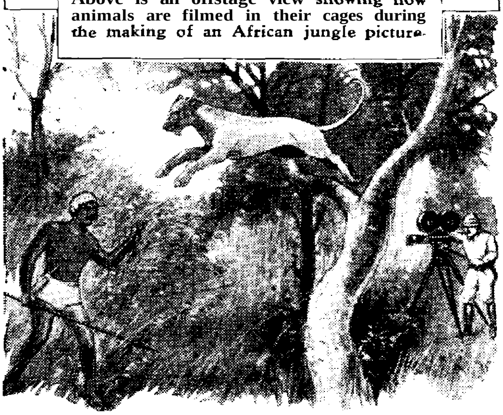
Dogs learn to speak when their trainers send them to a dummy, and by motions instruct them to drop basket and bark.



It may seem that these aviators are in great danger of being chewed up by leopards, but they're perfectly safe. Doubling for actors, they instruct the beasts to growl and perform by motions of arm, which serve as cues to the leopards. The audience, of course, is unaware of the deception.



Above is an offstage view showing how animals are filmed in their cages during the making of an African jungle picture.



Another case of movie deception. Trainer of the mountain lion, blackened up like African native, gives cue for the beast to leap on him when he lifts his arm, presumably to brush aside the bushes. Months of training have gone into this act. Theatre audiences are not aware that the trainer is signalling to the beast to attack.

embrace. So in the scene. Manifestly no sane animal trainer would permit even such a trusted animal as Jackie to leap on a stranger. The unexpected might happen.

Jackie roared not because he was told at the moment so to do, but because he has roared daily, month in and month out, in playful glee as Melvin and he have rolled around on an arena floor!

Wherever possible, the animal speaks at the same time the scene is filmed. It then is unnecessary to record the sound separately and match it with the picture. This adds to realism and saves trouble.

Occasionally, however, these beasts of the forest refuse to utter any noise. Not long ago 20 elephants from two famous circus herds raced through a California forest bent on destroying all that lay in their path. Alongside the trail a half-dozen movie cameras pointed up at their huge bodies, but the "mikes" failed to catch a squeal.

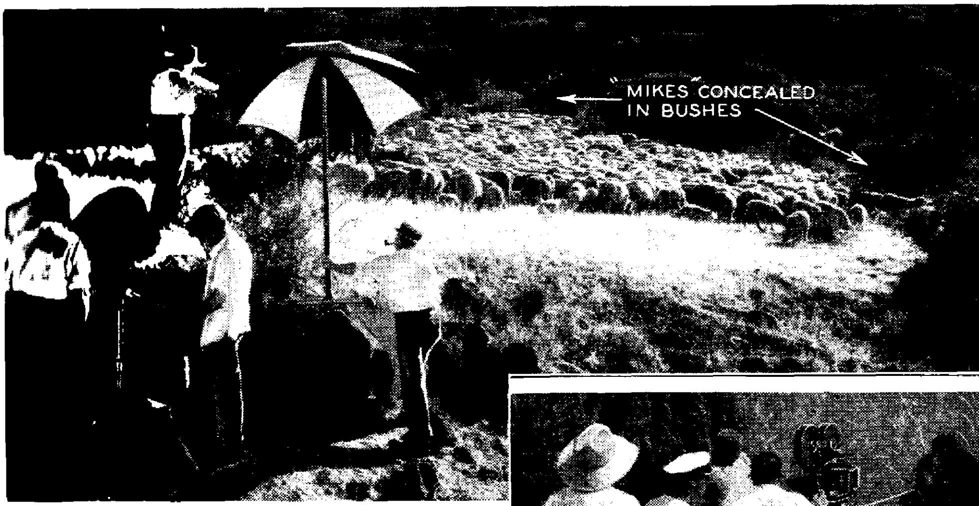
Strictly as scheduled, the herd pushed over small houses, knocked down prop trees, obliterated a village. They had rehearsed a week for this scene, had learned each move letter-perfect.

But the elephants refused to trumpet. They ran through the scene of destruction silently. The sound mixer sat at his apparatus, phones glued to his ears, but all he heard was the cracking of wood, tromp of heavy feet.

That evening we solved the sound problem and made the elephants "talk" for the mixer.

From my long experience I conjured up a simple arrangement which then brought to the screen one of the most devastating combinations of elephant sound ever heard. Quietly, as I moved among the two herds, I had the sound crew place four microphones near their feeding grounds. Then we placed the elephants' food just outside

Microphones Concealed About Scenes to Record Voices of Animal Actors



Even sheep can be directed—in one direction, providing they have an intelligent leader who can understand cues. The mikes concealed in the bushes catch the bla-a-a-a's.

on a range. As the hungry elephants began to trumpet, a corps of aids shoved the food within their reach. Here their trumpeting reached its climax.

All this was carefully timed, in order to synchronize their noises on the sound track with their movements through the pigmy village. Result: a perfect blending of violent action and savage animal sounds that created before the audience an illusion of terrific havoc.

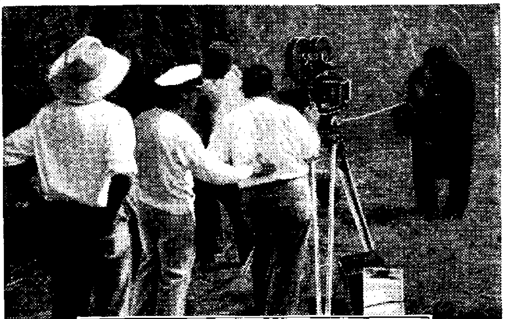
Amusing, Thrilling, Deadly Accidents Occur

Occasionally some accident will bring to the screen a thrilling encounter no director ever would plan in advance. One company, on location in the California mountains to film cougars in their native haunts, came upon a rattlesnake. He measured some four feet long, was a fine specimen.

With the company was an Australian police dog. His owner remarked suddenly, "turn the bloody snake loose and see what they do. My dog's smarter than any snake."

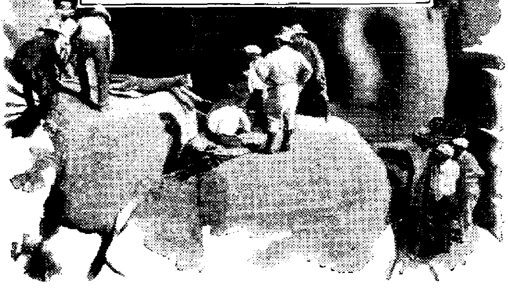
Assistants hurriedly brought up the microphone and the cameras were turned full on the rattler. Then for nine minutes—800 feet of film—the battle raged. The dog approached his prey much like a curious boy; he seemed to know the rattler could strike when coiled, and as the dog circled the snake's head moved around as though on a swivel. After the third strike, the dog moved in quickly and grabbed the rattler back of the head, thus ending the fight.

Later, to satisfy his curiosity, a cameraman examined the film to learn how long this deadly killer requires to strike. From the coiled position, to the fully extended position in the strike and returning to coil required only five frames, or one-fifth of a second. And the snake's head was blurred on each frame, so fast did it move!



Cameraman directing a gorilla, which is a man dressed in a gorilla suit.

Sound camera trained on a California mountain lion, ready for action, which starts when trainer gives proper cue.



Here's how a close up of a cougar's head is photographed. The ropes hold him down in place as his growls are recorded in the mike, the camera being focused on his head. With this scheme the actors, cameramen and director are in no danger of being chewed to hash.

New Device Tells Presence of Gas by "Remote Detection"

A NEW device which electrically records the presence of any toxic, explosive, or other gases, and which will immediately tell at a glance the exact quantity of these gases present, has recently been developed.

Designed to eliminate the danger of gas explosions of any kind, the detector will prove a great boon to police and fire departments, industrial plants, oil refineries, etc., for with it it is possible to determine in advance, and from a safe distance, the presence of dangerous gases and the degree of their danger.

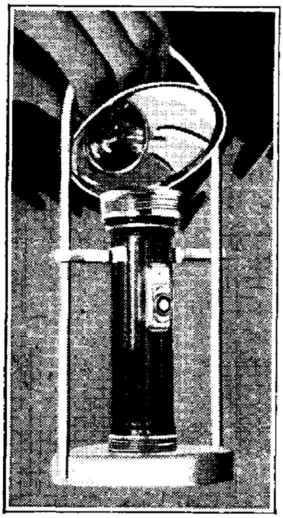
To make a test a long flexible rubber tube is dropped into the manhole or thrown into the gas-filled room. Squeezing on a rubber bulb then sucks up the gas into a chamber where a detector registers the amount of the gas present.

Gas is sucked up into indicator through rubber tube dropped into the manhole. Special meter tells degree of gas present.

Why Cannibals Relish Human Meat

WHY cannibals eat their enemies whenever they get a chance was explained in a recent lecture at the Royal Geographical Society, in London. There are a few individual cannibals who acquire so strong a taste for human meat that they may kill and eat enemies or strangers merely to get an enjoyable meal. The real reason for cannibalism, the native chieftain said, is to ward off harm from the invisible spirit of the enemy who was killed.

Utility Flashlamp for the Home



Mirror over flashlight directs beam in any direction desired.

A COLLAPSIBLE flashlight lantern that folds down to less than one inch in height has recently been invented by a San Antonio man. Constructed of plated, rustproof metal, the lantern is designed to hold any standard two-cell flashlight, as illustrated in the photo at the left. The polished surface, which can be adjusted to any angle, is mounted immediately over the flashlight.

Lamp Sunburns in 20 Minutes

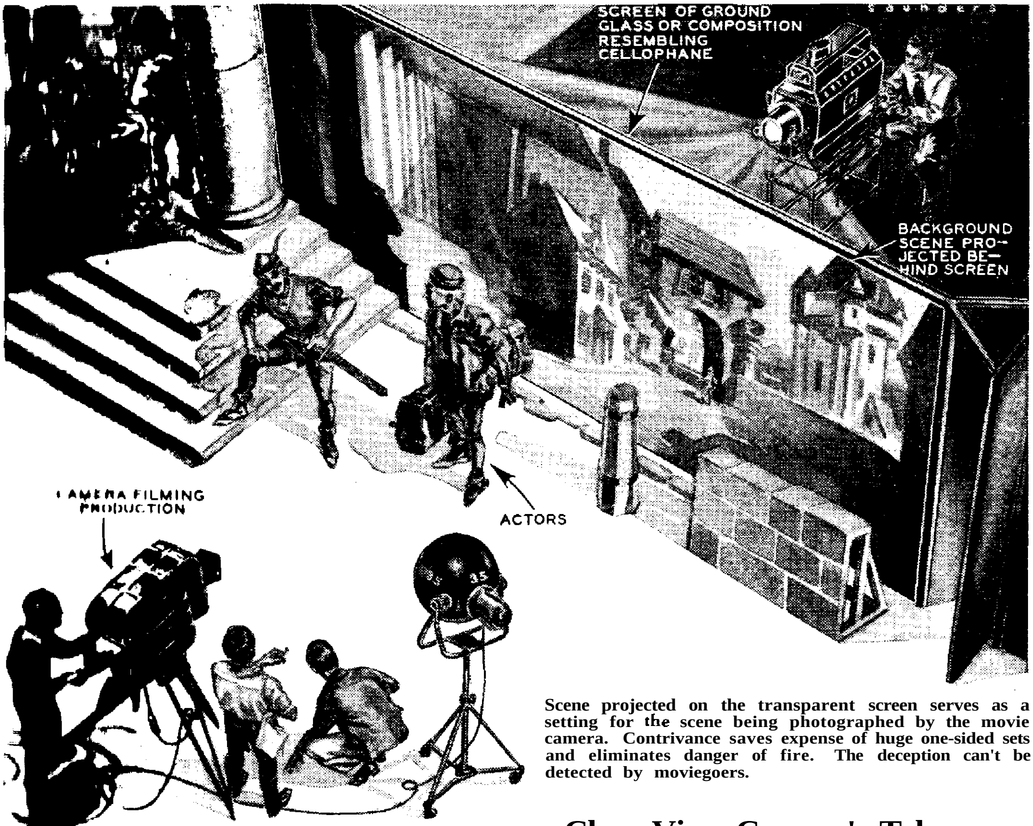
A NEW kind of glass used for the bulbs of ultra-violet lamps makes it possible to get a sunburn in 20 minutes. Termed a "soft" glass it transmits 50 per cent more of the ultra-violet energy generated in the lamp. This new lamp has found immediate use in the medical field for the treatment of skin diseases and for the cure and prevention of rickets.

Newly developed glass in this ultra-violet ray lamp permits it to sunburn human skin after a 20 minute application. Efficiency is increased by "soft" glass more than 50%.

Slickers Can't Go Back to Farm

THE chief obstacle to the "back to the land" movement, now much urged both in Europe and America as the only permanent cure for unemployment, is seen by a British sociologist in what he calls the "city mind," developed in a large fraction of the world's population by city life during the past century. Most of the people raised in the city have become permanently unsuited for farm life because they cannot stand solitude. They are accustomed to living and working in close contact with thousands of other human beings and can't break themselves of the habit. They must have whoopee or they pine away,

Synthetic Scenery Eliminates MOVIE Sets


SCREEN OF GROUND GLASS OR COMPOSITION RESEMBLING CELLOPHANE
BACKGROUND SCENE PROJECTED BEHIND SCREEN
CAMERA FILMING PRODUCTION
ACTORS
35
35

Scene projected on the transparent screen serves as a setting for the scene being photographed by the movie camera. Contrivance saves expense of huge one-sided sets and eliminates danger of fire. The deception can't be detected by moviegoers.

HUGE, one-sided sets built at great cost In Hollywood movie studios to recreate for the camera famous buildings and famous settings, are fast becoming obsolete. Stored away in round metal cans in the film vaults of Radio Pictures, are hundreds of well known synthetic settings, and cameramen are now being sent around the world to gather thousands more, to be used in a revolutionary new process called "rear projection."

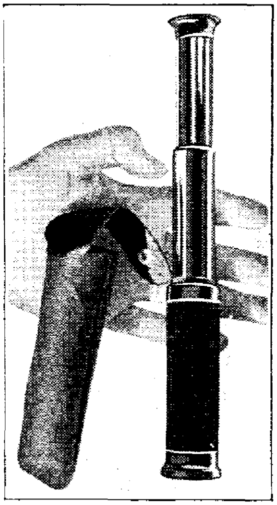
With the aid of a newly-developed cellophane screen, RKO trick photography experts are combining photographed backgrounds with live actors to achieve the same effect as if the whole cast were transported to the distant scene.

The desired background is photographed upon a film which is then projected onto the rear of a transparent screen, while action of the play goes on in front. The camera takes both actors and background, combining the two.

The method will largely save the construction of giant wooden sets to represent famous buildings. !n the early work with rear projection, a frosted glass screen was used, but presented difficulties because of its small size.

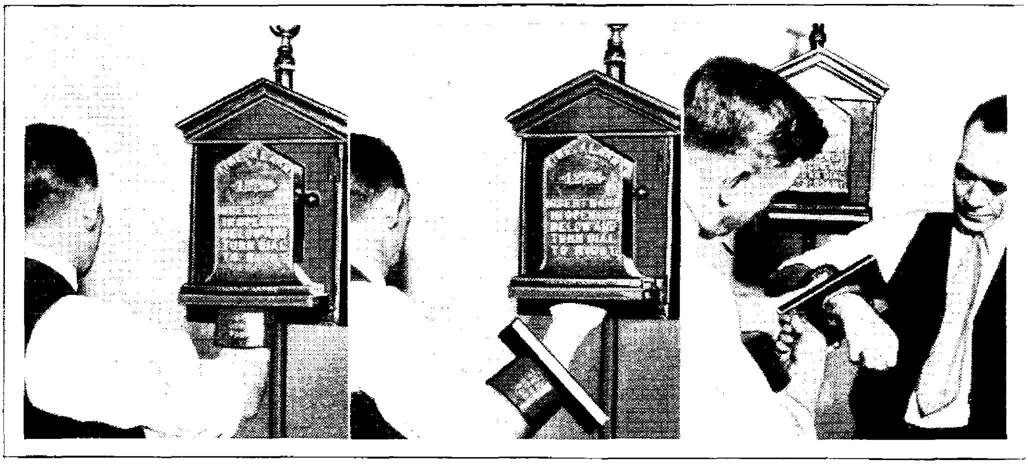
Clear View Camper's Telescope

IDEAL for explorers, Boy Scouts and campers in general is a new vest pocket telescope that brings far-away scenes right before your very eyes. Its extremely small size can be seen in the accompanying photo. It is a six power glass and has achromatic lens which make it possible to get a clear view of the entire field, not blurred at the edges as in the ordinary telescope. When not in use the glass may be folded up into a compact unit, placed in a small leather case and stowed in your pocket, where it will be out of the way.



Telescope has six power achromatic lens with fold-up barrel.

No More Thrills for Firebugs, Alarm Box Handcuffs Them

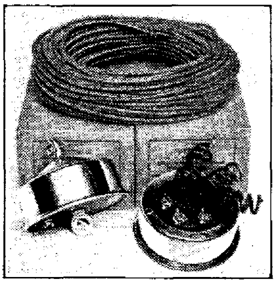


A firebug's Nemesis is this alarm box trap which handcuffs persons turning in false fire alarms. When hand is inserted to turn alarm dial, the cuff automatically clamps around the wrist, and can be removed only by firemen having keys.

PEOPLE who enjoy turning in false fire alarms are destined to have their pleasure abruptly curtailed, thanks to the invention of an alarm box which automatically handcuffs persons who call out the fire wagons without reason.

The alarm box may be seen in the photos above. To turn in an alarm it is necessary to put one's hand through an opening to turn a dial. After the alarm has been sounded a heavy steel clamp forms a cuff around the wrist. This cuff cannot be unlocked except by the fireman who has the keys. Unfortunately the device also catches persons sending in necessary alarms.

Antenna Reduces Man-made Static



Transformers and cable in antenna system eliminate "man-made" static.

A NEW type of antenna system, designed to reduce man-made static, has just been announced by manufacturers. Some of the distinctive advantages of this new system, as listed by the makers are: total elimination of electrical noises, commonly called man-made static; ease of installation, no tools other than a screwdriver being necessary; elimination of expensive line filters which are seldom effective; increase of signal strength on all broadcast bands.

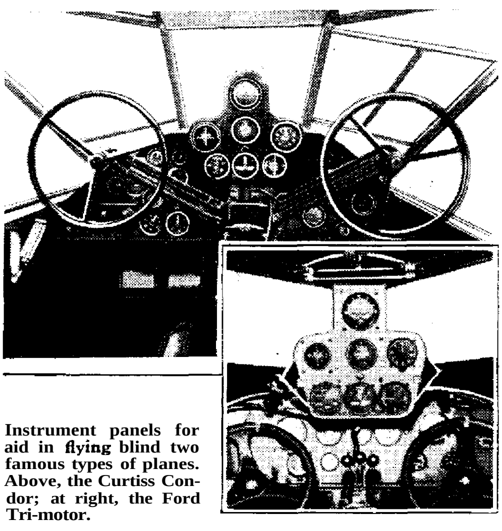
The system comes in kit form and includes two transformers, one to be attached to the antenna and the other to the radio receiver; and 50 feet of special low-loss cable which effectively shields the antenna against electrical interference.

Airplane Panels for Blind Flying

FLYING in all kinds of weather has become almost a necessity, and so science has taken a hand in designing instruments which help the pilot maintain a straight and accurate flight line without being able to see out of the plane.

Below are seen two panels used on two different planes of the passenger-carrying type. When fog, rain or snow blinds the pilot he simply keeps his eagle eye on his instrument panel.

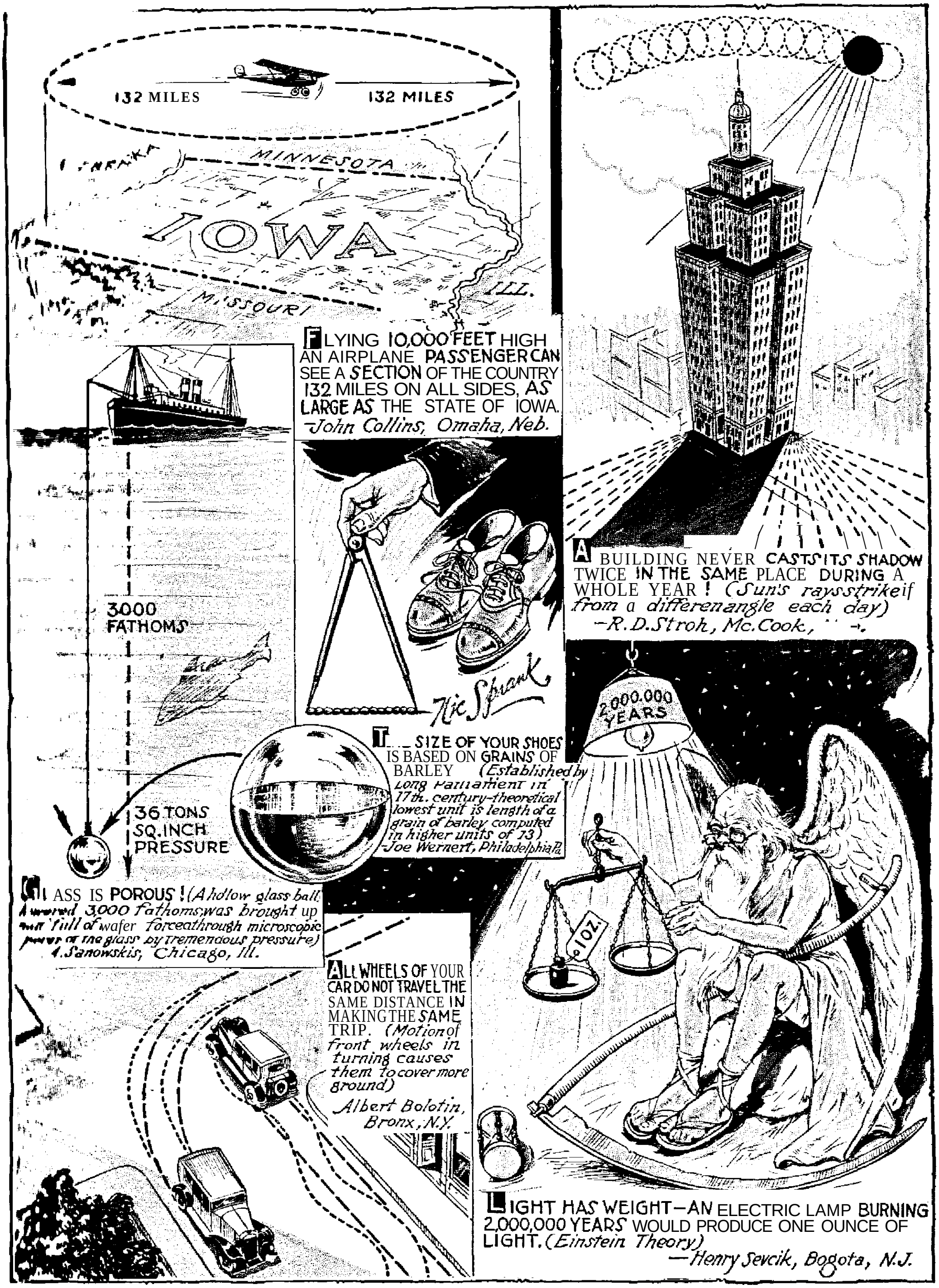
The top photograph below shows the panel arrangement of the Curtiss Condor, while at the right below is the panel on a Ford Tri-motor. Included among the instruments are a Bank and Turn indicator, an altimeter, a compass, a tachometer, an earth inductor compass and an artificial horizon.



Instrument panels for aid in flying blind two famous types of planes. Above, the Curtiss Condor; at right, the Ford Tri-motor.

Oddities of SCIENCE

by NIC SPRANK



FLYING 10,000 FEET HIGH AN AIRPLANE PASSENGER CAN SEE A SECTION OF THE COUNTRY 132 MILES ON ALL SIDES, AS LARGE AS THE STATE OF IOWA. —*John Collins, Omaha, Neb.*

A BUILDING NEVER CASTS ITS SHADOW TWICE IN THE SAME PLACE DURING A WHOLE YEAR! *(Sun's rays strike it from a different angle each day)* —*R. D. Stroh, Mc.Cook,*

THE SIZE OF YOUR SHOES IS BASED ON GRAINS OF BARLEY *(Established by Long Parliament in 17th. century—theoretical lowest unit is length of a grain of barley computed in higher units of 13)* —*Joe Wernert, Philadelphia, Pa.*

GLASS IS POROUS! *(A hollow glass ball lowered 3,000 fathoms, was brought up full of water forced through microscopic pores of the glass by tremendous pressure)* *A. Sanowskis, Chicago, Ill.*

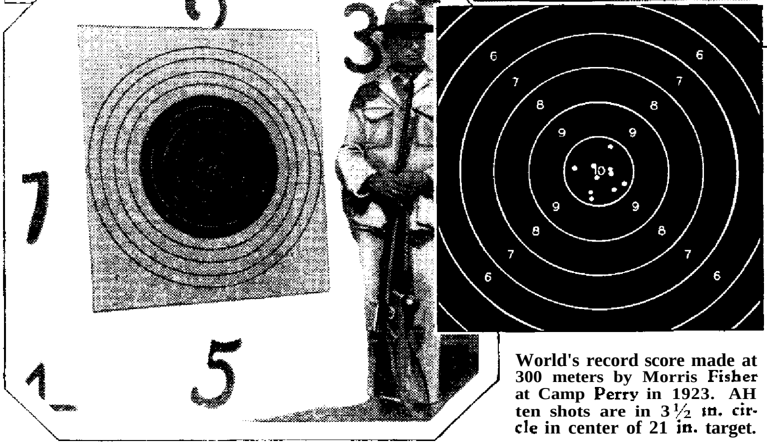
ALL WHEELS OF YOUR CAR DO NOT TRAVEL THE SAME DISTANCE IN MAKING THE SAME TRIP. *(Motion of front wheels in turning causes them to cover more ground)* *Albert Bolotin, Bronx, N.Y.*

LIGHT HAS WEIGHT—AN ELECTRIC LAMP BURNING 2,000,000 YEARS WOULD PRODUCE ONE OUNCE OF LIGHT. *(Einstein Theory)* —*Henry Sevcik, Bogota, N.J.*

ONE DOLLAR will be paid by Nic Sprank for oddities of science used on this page. Send in your ideas—no limit to the number of suggestions you may make, but be sure to enclose proof of your statements. Maybe your ideas will be better than those shown on this page—if they are, Nic Sprank wants them and will be glad to send you a check. Address suggestions to Nic Sprank, care of Modern Mechanix and Inventions, 529 South Seventh Street, Minneapolis, Minn.

You Can Be an EXPERT

Morris Fisher receiving congratulations from Gen. Lejeune, of Marines, on winning world's marksmanship record.



World's record score made at 300 meters by Morris Fisher at Camp Perry in 1923. All ten shots are in 3½ in. circle in center of 21 in. target.

Choosing a mechanically perfect rifle and developing a mechanically perfect aim will make you an expert shot, as a veteran marksman tells you here.

THOSE who read fiction, and especially Western fiction, will naturally come to the conclusion that an expert shot is some sort of a superman who has been endowed by the gods with some uncanny skill for directing a bullet, with the utmost nonchalance, toward any target that strikes his fancy or arouses his ire; but twenty years on the firing line have taught me that expert shooting is merely a matter of mechanical perfection.

Shooting is entirely a mechanical act. A rifle is merely a tube to direct the force of the explosion and a bullet is a piece of metal which is propelled by that explosion. On one end of the tube is a chamber into which the powder and bullet may be placed, after which the chamber is closed by a simple mechanical device, leaving the tube, or rifle barrel, as the line of least resistance for the explosion.

Causing the explosion of the powder is also a mechanical operation—simply the releasing of a spring which causes a pin to hit and detonate a bit of highly sensitive explosive, which in turn ignites the powder.

All the rest of the rifle is merely added for convenience in handling, while aiming is only the mechanical operation of lining up two points on the rifle barrel with the object you desire the projectile to hit.

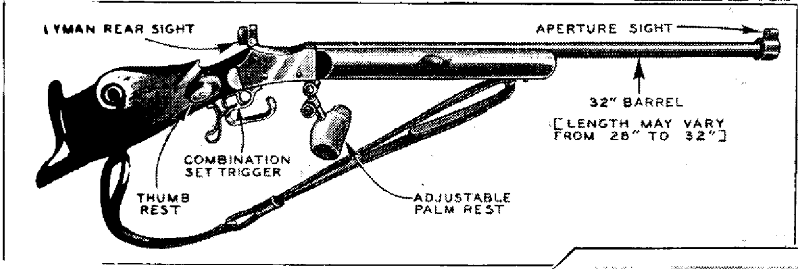
Yes, it's as simple as all that. Anyone not blind or crippled can perform these easy operations, while any good mechanic, given the proper tools, could turn out a device that would enable you to direct the force of your explosion. The difference between shooting at something and winning

RIFLE SHOT

By Gunnery-Sergt. MORRIS FISHER, U.S.M.C., Olympic Rifle Champion 1920 and 1924, World's Champion 1923 and 1924, Holder of 3 World's Records

A comparison with the youngster in this photo will give you an idea as to the size of the match rifle used in Olympic contests.

Morris Fisher, shooting champ, aiming the match rifle for a bull's-eye shot. Note the palm rest, which is used to rest rifle and align sights on the target.


LYMAN REAR SIGHT
APERTURE SIGHT
32" BARREL
[LENGTH MAY VARY FROM 28" TO 32"]
COMBINATION SET TRIGGER
THUMB REST
ADJUSTABLE PALM REST

Unusual features of the match rifle are seen in this drawing. The butt is especially carved to fit the shoulder of the marksman. Trigger action is faster than in ordinary ride.

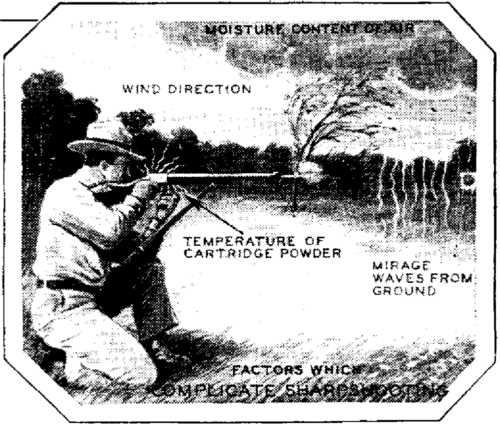
A rifle championship is simply a matter of perfecting the ammunition, the rifle, and the mechanical motions of aiming the rifle.

While any good rifle offered for sale by a reliable dealer will do for hunting, or the shooting done by the average man, these rifles, like the good but inexpensive autos now on the market, are turned out in large quantities, and are not given the individual attention necessary to obtain mechanical perfection.

You will look in vain through your sporting goods catalog for a weapon such as is used at the International Rifle Matches, and there Is as much difference between a store gun and a match rifle as there is between M flivver and Major Seagrave's record-shattering nicer.

About the only part of the ordinary rifle used is the heavy barrel turned out by the best gunsmiths at Springfield; and these are polished by careful lapping in the hands of experts at the Marine Corps Quartermaster Depot at Philadelphia, the late Gunnery Sergeant Emil Blade doing most of the work on the rifles used by the American team.

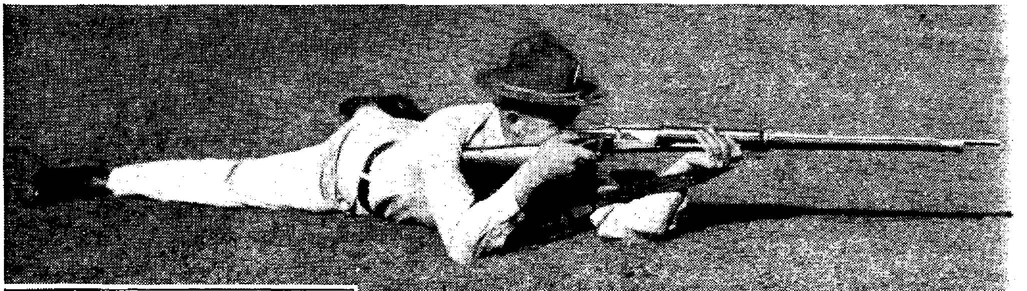
These heavy barrels are then embedded carefully in an over-size stock such as is shown in the accompanying photograph, while an expert wood-carver, who makes fine violins in his spare time, works on the stocks until the balance is perfect. Some excess wood is left on the butt, and this is carefully rasped to fit the individual requirements of the man who will shoot that particular piece.


MOISTURE CONTENT OF AIR
WIND DIRECTION
TEMPERATURE OF CARTRIDGE POWDER
MIRAGE WAVES FROM GROUND
FACTORS WHICH COMPLICATE SHARPSHOOTING

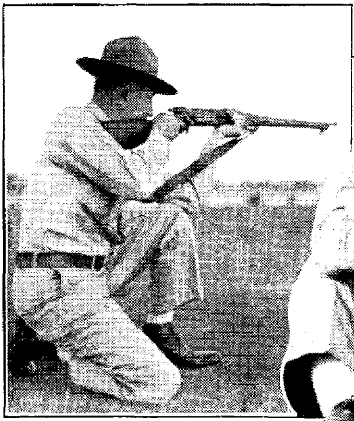
The nature of the elements at time of match must be taken into consideration. Strong winds can swerve bullets off path, while heat waves from ground cause target to shimmer in the sights. Temperature affects speed of the projectile.

Four refinements, that will not be found

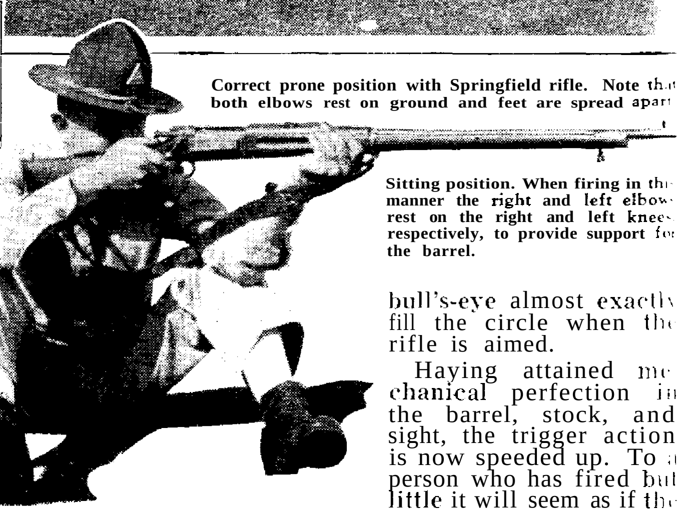
Here's Correct Way to Fire From **Prone,** Kneeling and Sitting **Position**



Correct prone position with Springfield rifle. Note that both elbows rest on ground and feet are spread apart



Morris Fisher here demonstrates the correct kneeling position with the service rifle, elbow rests on knee.



Sitting position. When firing in this manner the right and left elbows rest on the right and left knees respectively, to provide support for the barrel.

in any other type of rifle, are then added. These are an adjustable fibre butt plate which exactly fits the user's shoulder, an adjustable and removable lower prong which counterbalances the muzzle weight when the piece is fired from a standing position, and adjustable palm rest, and an adjustable front sling swivel.

The palm rest is a large cork ball which may be moved, after the user has taken his position, until the sights are lined up on the target without the shooter having to move from his natural and comfortable stance.

The butt plate and sling swivel answer the same purpose as the palm rest, in that they permit the shooter to take up a normal position and then to adjust the rifle to the target, rather than to take a strained position in order to line up his sights—a defect to be found in all ordinary rifles, for one can never depend upon the target being in the same relative position to the ground he stands on at all times,

The most popular sight, although not in universal use in championship competition, is the Lyman 48B aperture sight. The aperture of the rear sight is the size of a pin-hole, while the front sight is a circle of metal mounted on a post. Different sizes of front sight apertures are used on the various ranges, the idea being to have the bull's-eye almost exactly fill the circle when the rifle is aimed.

Having attained mechanical perfection in the barrel, stock, and sight, the trigger action is now speeded up. To a person who has fired but little it will seem as if the trigger pull and explosion are simultaneous; yet any expert shot can tell you that there is enough lag between the time the trigger is pressed and the firing pin meets the primer to allow the sights to stray from the target. This straying may be infinitesimal, but one doesn't have to waver much to get out of the 3½-inch center of a 21-inch bull's-eye at 300 meters.

On the match rifles two triggers are used. The first cocks the piece, while the second may be set off at the slightest touch. The heavy firing pin action of the ordinary rifle is noticeably speeded up in the piece we use, permitting the weapon to be discharged at the exact instant desired.

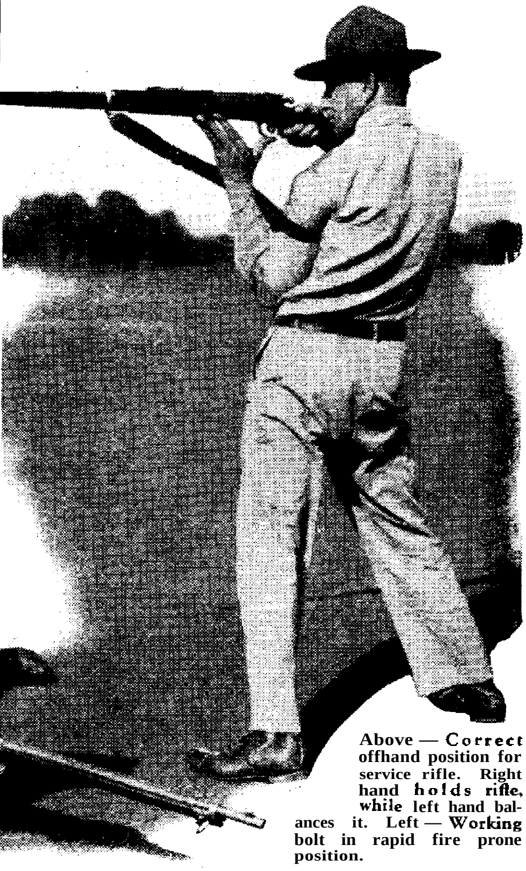
Good Physique Helps Skill

Given good eye-sight and normal development, the mechanical act of lining up the sights and discharging the piece at the precise instant when they are lined up—and only then—can come only through constant practice. The average person is a poor shot merely because he will not take the pains to develop those muscles needed to hold the rifle without wavering, and because he will not exercise the will power required to refrain from pressing his trigger until his sights are properly aligned.

It is taken for granted that only ammunition that is as near perfect as possible will

Left Hand Aligns Sights, Right Hand Holds Rifle in Standing Position

The correct standing position for the match rifle. The left arm rests comfortably against the side.



Above — Correct offhand position for service rifle. Right hand holds rifle, while left hand balances it. Left — Working bolt in rapid fire prone position.

be used; but this is one worry that need not bother the rifleman. While no two bullets or charges of powder are absolutely alike, the scientists of the leading arms manufacturers have developed a nearly perfect product, and any of the high-grade cartridges, if not allowed to deteriorate, can be depended upon to give good results.

Having overcome as far as possible any mechanical deficiencies in the piece, the ammunition, and oneself, there remains the elements to contend with; and the expert shot must become somewhat of a meteorologist if he expects a good score.

Temperature Conditions Affect Accuracy

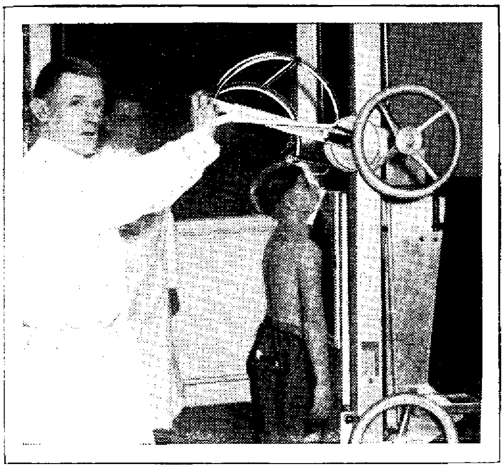
The explosion in the cartridge being simply a generation of heat through the burning of the powder, the temperature of the powder at the time of firing can make considerable difference in the speed of combustion; a difference of only ten degrees raising or lowering the shot nearly two inches at 300-yards. Thus the temperature must be considered when the sights are set, since in International matches no sighting shots are permitted, and the match is often won or lost on the first shot.

Since air is heavier when moist, it offers more resistance to the bullet than it does in dry weather. When the light is bright and the weather is hot the mirage will cause the image of the target to be distorted. When the wind is from behind it will speed up the bullet, while it will slow it down when from in front, thus forcing you to aim higher to overcome the additional pull of gravity. If the wind is from the side it will carry your bullet with it (one inch for every 100-yards for each ten miles per hour of wind). All of these factors must be computed accurately when setting the sights for the first shot. You may compensate for errors of judgment on subsequent shots, but with every competitor capable of firing a "possible," it may be too late then.

Nine Years to Win a Championship!

If all of this sounds too complicated for you and you feel that you can never attain this mechanical perfection, it might encourage you to know that I failed to qualify on the range my first year in the Marine Corps, that it took me three years to make the team, and nine years to win a championship. The rest was easy.

New X-ray Turns Out Picture for Sixty Cents in 24 Hours



Pupil of New Haven, Conn., school being X-rayed with new machine which makes the picture for 60 cents and turns out in 24 hours. Many cases of T. B. were discovered.

THE high cost of X-ray pictures has hitherto made physical examinations prohibitive to most people, but thanks to the development of a new high speed machine pictures can be taken for as low as sixty cents.

The new X-ray machine, shown in the photo at the left, will make as many as 150 pictures per hour, and deliver the negative a day later. It was introduced recently by the Board of Health of New Haven, Conn., where 6,500 of the 10,000 school children were X-rayed for the purpose of detecting incipient tuberculosis.

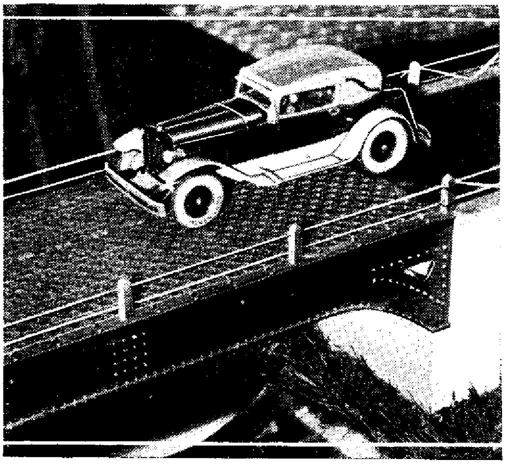
Through the X-raying many interesting discoveries have been made in connection with the health of the pupils that would never have manifested themselves in any other manner. The photo at the left shows a side view of the machine with the pupil being X-rayed.

Grating Is Non-skid Surface

SKIDDING on bridges—the most dangerous place in the world to skid—is a peril that is in a fair way to he relegated to oblivion, thanks to the development of a new type of bridge floor which furnishes non-skid surface for automobile tires.

Known as "Irving Decking" the surface is roughened with a metal grating that prevents the formation of a coating of ice on the surface, and drains off the water rapidly after a downpour. The decking has an even surface and weighs only 22 lbs. to the square foot, including the supplementary beams.

Though non-skid, it does not cause any extra hard wear on the tires. The model of the new bridge grating, shown below, was on display recently at an engineering exhibition in New York.



Here's the model of the new bridge which has special non-skid grating which weighs only 22 lbs. to the square foot.

What Does Your Voice Look Like?

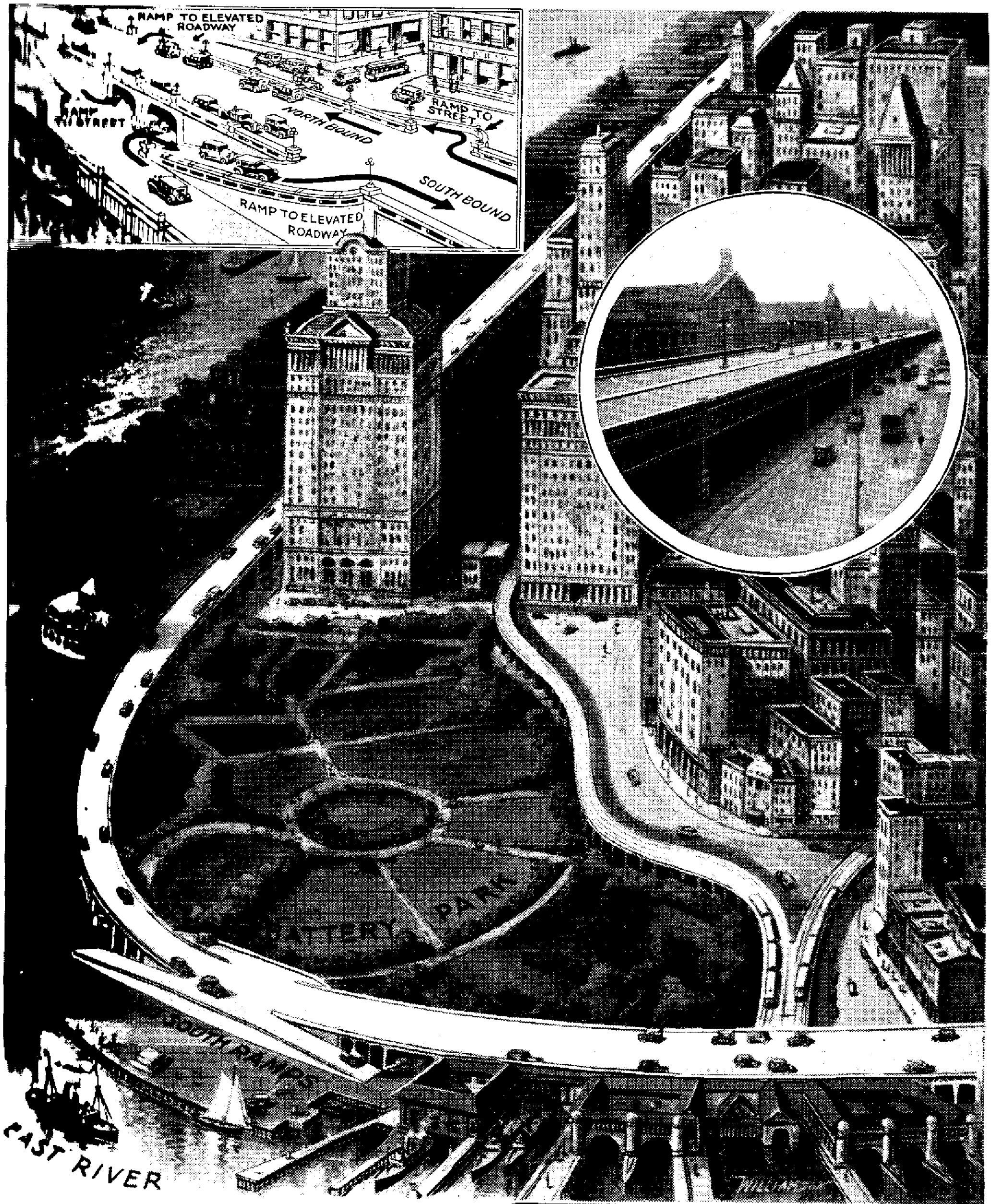
Speaking to the mike of this "strobilion" records the character of voice vibrations in a pattern of squares on a revolving disc. Helpful for singers, actors, train callers.

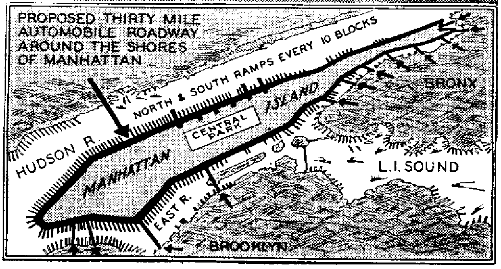
AT A "seeing show" held recently in Chicago by the Cook County Optimetric Association, a strange gadget was to be seen on display. It was a "strobilion," a machine which visualizes and records voice vibrations on a revolving disc, as illustrated in the photo above. When you speak into the mike, a pattern of lines forms on a revolving disc to reveal the character of your voice. The gadget proves helpful for singers, actors, train callers, and others who do a lot of shouting.

Right Diet Is Key to Long Life

IF YOU want to live to a ripe old age science advises you to follow a program of scientific nutrition. The two main essentials are energy foods and vitamins and minerals. After you have fulfilled these requirements you can eat whatever food you like. Milk is found to be one of the chief ingredients of the long-life diet, containing most of the necessary elements.

AERIAL Boulevard to Speed City Traffic


RAMP TO ELEVATED ROADWAY
RAMP TO STREET
NORTH BOUND
RAMP TO STREET
SOUTH BOUND
RAMP TO ELEVATED ROADWAY
BATTERY PARK
SOUTH RAMPS
EAST RIVER


HUDSON R.
NORTH & SOUTH RAMPS EVERY 10 BLOCKS
MANHATTAN ISLAND
CENTRAL PARK
EAST R.
BRONX
L.I. SOUND
BROOKLYN

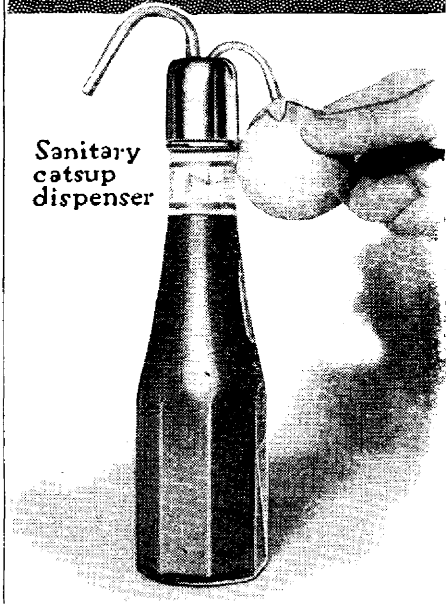
PROPOSED THIRTY MILE AUTOMOBILE ROADWAY AROUND THE SHORES OF MANHATTAN

THE long search for a means of solving the traffic problem raised by the alarming congestion of Manhattan, the most densely populated area in the world, has at last found a solution in the construction of a novel aerial highway recently proposed by engineers. Following the Manhattan shore line, as illustrated, the roadway will be thirty miles long and will offer an unobstructed thoroughfare to vehicular traffic, permitting running time to be reduced four-fifths, it is estimated.

LATEST in MECHANICAL

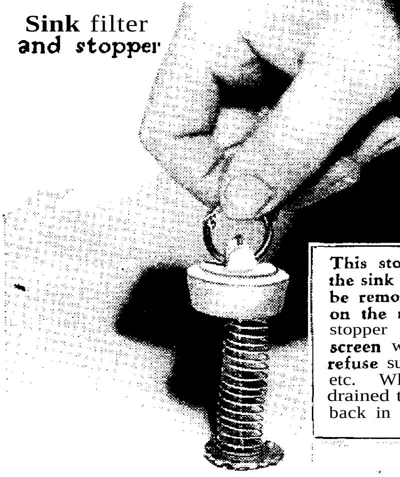
Beauty vibrator—

Reproducing the patting **motions** of famous Hollywood masseurs, this new vibrator keeps **milady's** complexion smooth and clear. It **also** has many attachments for treatment of **scalp** and hair, and a **buffer** for polishing the teeth and massaging the gums which has been scientifically designed by a leading dental authority. A modulator on the motor scientifically adjusts the intensity of the vibrations for the individual complexion.



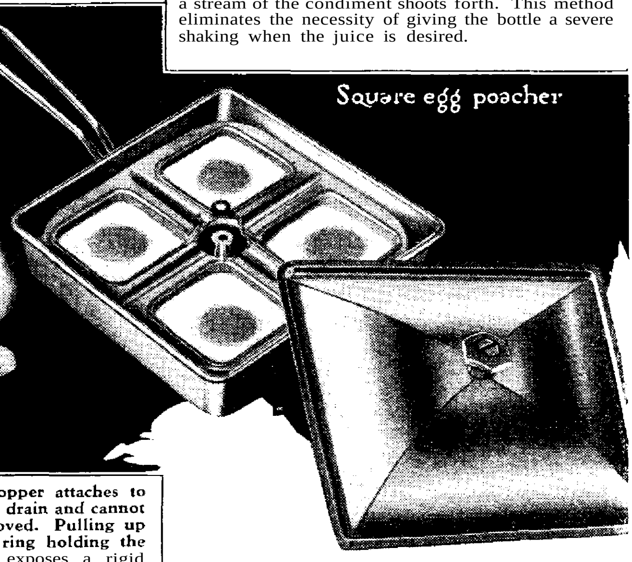
Sanitary catsup dispenser

Catsup is easy to manipulate with this new **sanitary** dispenser. The cap, which fits over the top of the catsup bottle, is equipped with an exhaust pipe and a **bulb.** When you want catsup on your eats you **simply** point the exhaust pipe in the general direction of the grub and squeeze the bulb, whereupon a stream of the condiment shoots forth. This method eliminates the necessity of giving the bottle a severe shaking when the juice is desired.



Sink filter and stopper

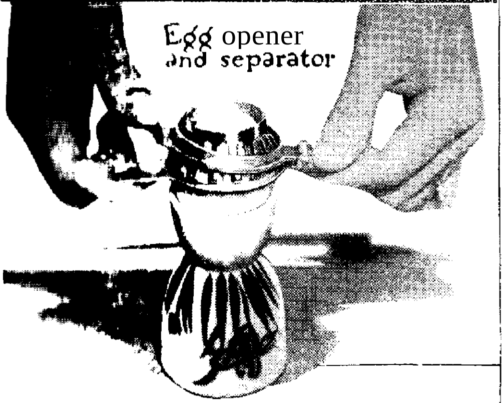
This stopper attaches to the sink drain and cannot be removed. Pulling up on the ring holding the stopper exposes a rigid **screen** which catches **all refuse** such as hair, lint, etc. When water has drained the stopper snaps back in place.



Square egg poacher

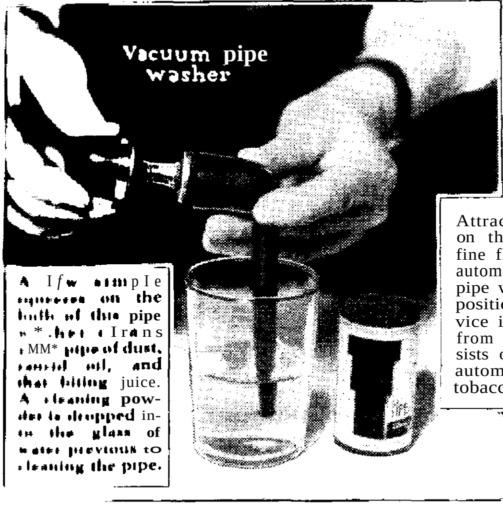
When poached eggs come out of this pan they fi squarely on the toast. One to four eggs can b poached in four minutes, starting with **cold wate** Since the eggs do not come in direct contact with the water the flavor is **greatly** improved. Th **aluminum** pan may also be used as a frying pa or **cake** tin. Eggs fit in **removable compartment**

HOUSEHOLD Conveniences



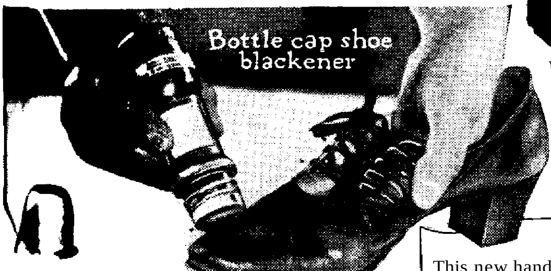
Egg opener and separator

A clean, cut job of opening soft boiled eggs, peeling hard boiled eggs and separating raw eggs is performed by this new handy kitchen device. Pressure on the thumbpiece operates a set of claws which cuts offs shell.



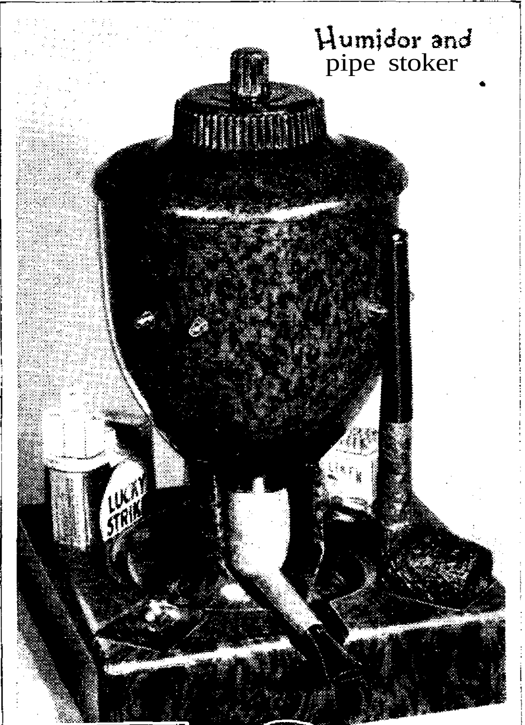
Vacuum pipe washer

A few simple squeezes on the bulb of this pipe washer cleans pipe of dust, rancid oil, and that biting juice. A cleaning powder is dropped into the glass of water previous to cleaning the pipe.



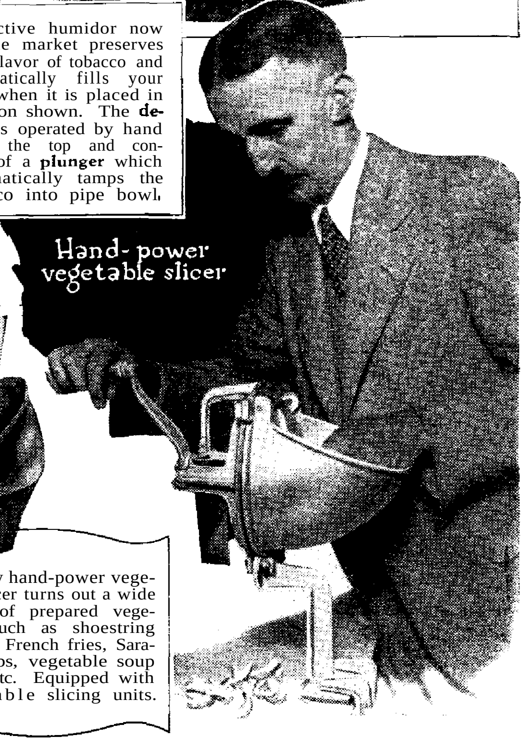
Bottle cap shoe blackener

A minimum of inconvenience and messiness is involved in cleaning and blackening shoes with this new polish bottle which is equipped with a pad that gets saturated with polish when you tip up the bottle for a blackening job. A metal cap fits over the pad when the polish is out of use and prevents evaporation of the liquid.



Humidor and pipe stoker

Attractive humidor now on the market preserves fine flavor of tobacco and automatically fills your pipe when it is placed in position shown. The device is operated by hand from the top and consists of a plunger which automatically tamps the tobacco into pipe bowl.

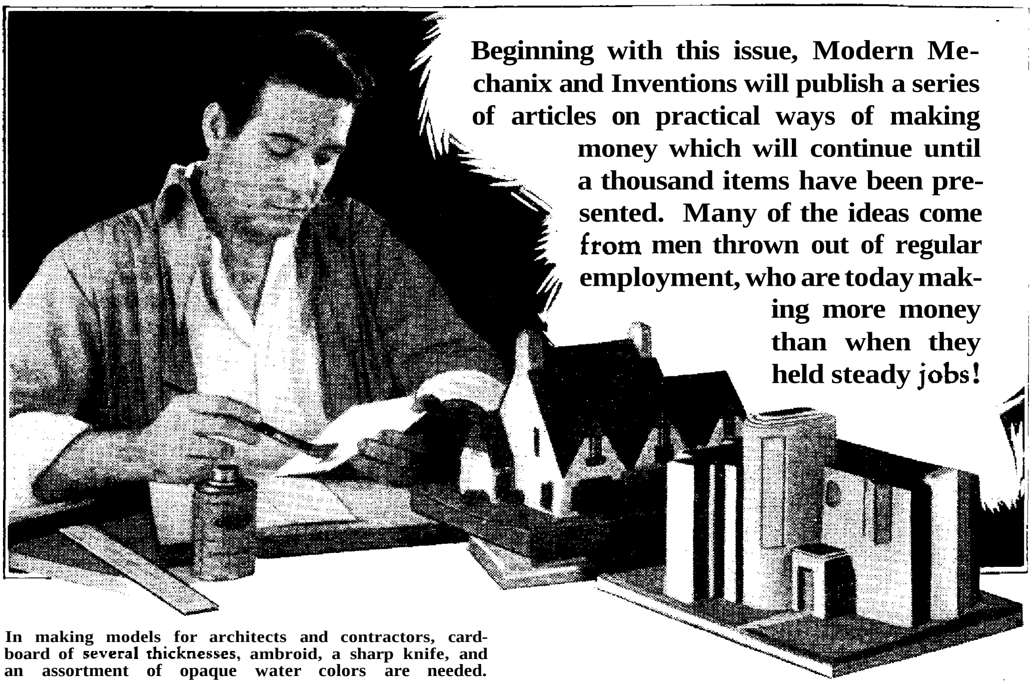


Hand-power vegetable slicer

This new hand-power vegetable slicer turns out a wide variety of prepared vegetables such as shoestring potatoes, French fries, Saratoga chips, vegetable soup stocks, etc. Equipped with adjustable slicing units.

ONE THOUSAND WAYS

Beginning with this issue, Modern Mechanix and Inventions will publish a series of articles on practical ways of making money which will continue until a thousand items have been presented. Many of the ideas come from men thrown out of regular employment, who are today making more money than when they held steady jobs!



In making models for architects and contractors, cardboard of several thicknesses, ambroid, a sharp knife, and an assortment of opaque water colors are needed.

House Models for Architects

ARCHITECTS and contractors can easily be sold cardboard models of proposed buildings, memorials, parks, etc., of their design. They in turn use these models to show a prospective customer just what his building will look like, making them a potent aid to sales, and in addition enabling changes to be made in the design which the customer would not be able to do if he worked from prints which he could not understand. Only a small investment is required — various weights of cardboard, wooden bases, ambroid for gluing, sharp knives, painting equipment. It is advisable first to make a fairly elaborate model from a set of blueprints, to show what you can do. The models built by the workman in the above photo brought him all the work he could turn out. Models of prominent structures in your own town can also be rented out for window display purposes on a weekly basis. In Chicago a model of a home, placed in a bank window with literature on the bank's services to home owners, brought much comment.

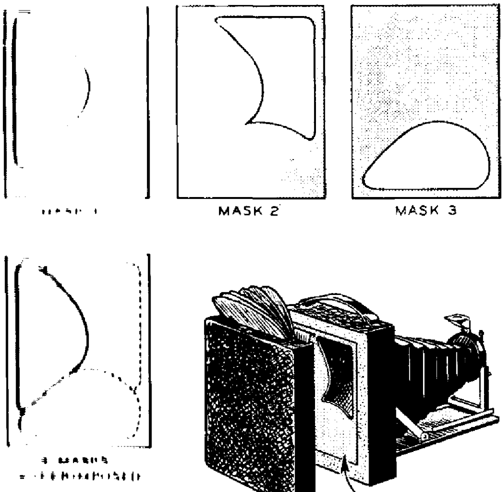
A Community Ad Sheet

FORTY-FIVE dollars a week is the current income of a young man whose alert mind saw the profit-making possibilities of a small community advertising sheet. He lived in a large city and the neighborhood territory was covered by downtown papers, but local tradesmen did not care to advertise in papers which covered the whole city, for their trade was limited to the shopping area. The young man rented a mimeograph, solicited ads from neighborhood stores at moderate prices, filled the reading columns with items concerning people of the district, and ran off a four sheet edition, stapled together at the top. Every home in the neighborhood received a free copy of his first issue, delivered on Friday, carrying ads of Saturday's sales. Results from advertising were so satisfactory to the merchants that they are now steady patrons, and the publisher's main job is to take care of preparing the ads and distributing the paper. The idea works equally well in a small town, especially if the town has no local newspaper.

CASH FOR MONEY-MAKING IDEAS!

Have you worked out some ingenious, practical way of making money, either as & full-time job or a spare time activity? Perhaps some friend or neighbor, thrown out of work, has used his wits to devise some money-making scheme which brings better returns than the job he lost—this very thing has happened so often recently that many men look on the depression as a blessing in disguise. For all accounts used in this money-making department of the magazine, payment will be made at regular rates. Here's your chance to become an author! Keep your article brief, and address it to Modern Mechanix and Inventions, 529 S. Seventh Street, Minneapolis, Minn.

TO MAKE A LIVING



Jig-saw photographs can be made with masks cut as shown in the drawing, making three exposures on the same film with successive masks in place. A photo so made is shown at the right — a power company paid a good price for the picture, which was cut into a jig-saw puzzle as an advertising novelty.

Jig-Saw Advertising Photos

THERE IS a little-worked market for ingenious advertising novelties which has proved lucrative to a San Antonio, Texas, cameraman who found that jig-saw advertising photos, as shown above, sold like the proverbial hot cakes. Any inexpensive camera of the type which uses film packs or plates can be used. The photo shown was taken with three masks, cut to block out various areas of the film. Three exposures were then made on the same negative, placing the musks successively in place, so that when printed the picture resembled a composite photograph, ideally adapted to jig-saw purposes. The company distributed this novelty as a premium to customers who paid bills within the discount date, speeding up collections so satisfactorily that the cameraman has a steady market for his output which he is expanding among other concerns.

Money in Shoes

WHEN he lost his job, a young New York man made a deal with a small shoe repair shop for a commission on all business brought in. He figured that convenience was the deciding factor in attracting shoe repair business, so he organized a pick-up service with house to house solicitors, and soon hud so much business that the repair man was forced to put in extra help. Dividing the commission with his salesmen and saleswomen, he soon had a good income and helped others make considerable money. A sideline, the buying of old shoes at very low prices, added to this income.

Dress Exchange Club

A CHICAGO woman, finding herself without a suitable gown for a party, borrowed one from a neighbor. From this circumstance she conceived the idea of forming dress exchange clubs, each member of which contributed a gown in good condition of which she was tired. On payment of $1 such members were then permitted to select any dress from the stock to be worn on a given occasion and returned in good order. Profits to the organizer were gratifying, since out of the dollar fee she had only her own time to charge off, and the expense of minor repairs to gowns.

Cash for Gold

A MANUFACTURING jeweler whose business failed took a $10 bill and set out from house to house to buy old gold and jewelry. He bought for cash, allowing a good margin of profit, turning over his capital several times a day, re-selling the gold for practically its full value to a jeweler who melted it down. Simple testing methods to determine value of gold will be furnished by any jeweler with whom one wishes to work.

Making a Bicycle Pay

A TEEN-AGE boy in a California city had a bicycle but no income. He hit upon the idea of building a large signboard which he mounted on wheels and attached to the back of his bicycle. Advertising space was sold to various local concerns. The boy

Every photographer has old exposed cut film for which he has no use. This man makes $40 a week cleaning such film, binding the edges with black tape, as shown in the photo, and selling them as menu covers to restaurants.

took care of having the signs painted, receiving a sales commission from the sign painter. These were fastened to his traveling signboard and he pedaled up and down the streets of his home city, covering residential as well as business districts. The novel appearance of his bicycle ad trailer won much comment from customers who did business with the advertisers, with the result that this ingenious business is now paying the youth an income much larger than he had ever imagined possible.

Menu Covers From Film

A CHICAGO bond salesman, finding himself without employment, hit upon a way of earning a comfortable living by making menu covers from old film which accumulates in any photographic studio. He collected old negatives which the photographers were glad to get rid of, choosing the stiff variety known as cut film. These he cleaned thoroughly and with imitation leather tape, bound the edges into a transparent case to preserve the menus against the ravages of constant handling. After making up some sample menu covers, he called on restaurants and offered his serviceable article at an attractive price. His income ranges around 840 a week.

Party House

A COUPLE in a Minnesota college town, finding their large home a burden but being unable to sell it, turned it into a Party House. Retaining two rooms for their exclusive use, the man and his wife rented the rest of the house for luncheons, teas, dinner parties and supper dances at the rate of ten cents a guest. A neighbor agreed to do the catering at surprisingly low figures and also did a good business, though many of the parties brought their own refreshments, leaving the left-overs to pay for dishwashing, which was gladly done by two colored girls living nearby.

Collecting Pollen for Profit

ACCORDING to officials of the U. S. Bureau of Plant Industry, pollen collected from weeds and flowers is in demand by many medical supply houses whose addresses you can secure from your neighborhood druggist. The simplest way to collect pollen is to tie a paper bag over the flowering weed. This is left tied for a few days and then the weed is shaken, dislodging the pollen into the bag, which is then removed. It is not necessary that pollen from each kind of plant be kept by itself, but small insects and dirt should be eliminated. The cleaner the pollen the higher the price you will receive.

Revamping Rural Mail Boxes

RURAL mail boxes have a way of going to pieces rapidly. Rickety and weather beaten, they are eyesores along country roads and you can capitalize on this dilapidation by painting them up to look like new. Most farmers will be glad to pay you a small sum to refurbish them. It will be found advisable, in soliciting jobs, to take a freshly painted mailbox with you tp show what you can do. A set of stencils for painting names, a can of black and one of moisture-proof aluminum paint will be all the equipment you need.

Distributing Fresh Bread

A BAKER out of work made arrangements with his former employer to turn out a special baking of afternoon bread. He

Medical supply houses use the pollen collected from weeds for drug manufacture. The photo above shows how pollen is collected by tying a sack over flowers. After several days the pollen is shaken off and the bag removed then distributed cards announcing this fact and offering to deliver the fresh bread if the card were hung in the window before a certain hour. So successful was the plan that he was soon reemployed by the bakery to take charge of city-wide distribution of the afternoon bread on this plan.

Serving Beverages to Workers

WORKMEN on construction jobs, longshoremen on docks, laborers on road work can do with a cup of coffee in mid-morning or afternoon. Supplying them with this beverage will bring in a nice profit, one man has found. It is not difficult to get the consent of the boss, who understands that a refreshing drink will stimulate the men to renewed effort on the job. A can with a funnel, strapped over the back, cups and a small supply of cream and sugar will be all the equipment called for. In hot weather a cooling drink, such as iced tea or lemonade, may prove more popular than coffee.

Stenographic Training

A NEBRASKA stenographer, unable to find a position, determined to use her ability in another fashion to support herself. By means of a want ad she offered to teach shorthand and typewriting privately for board, room and laundry. She was soon engaged by a family with two daughters, where she remained several weeks. Before her first engagement was completed she was scheduled for eight months in advance and found that in most instances she was asked to do occasional stenographic work for which she was well paid.

Laying Garden Walks

WITH spring coming, the season for improving the back yard and garden is at hand. A canvass of houses with large back yards will yield many jobs for building garden paths and garage approaches. One Illinois man makes a nice income from this work. To make a walk, he excavates the soil to a depth of two inches and fills the space with clean crushed rock or gravel, which is tamped or rolled. Then he sprays on a cold asphaltic binder (the editors will give you the name of the manufacturer on request) and sprays on small screenings to fill any crevices. With a second application of binder and screenings, the job is rolled and completed.

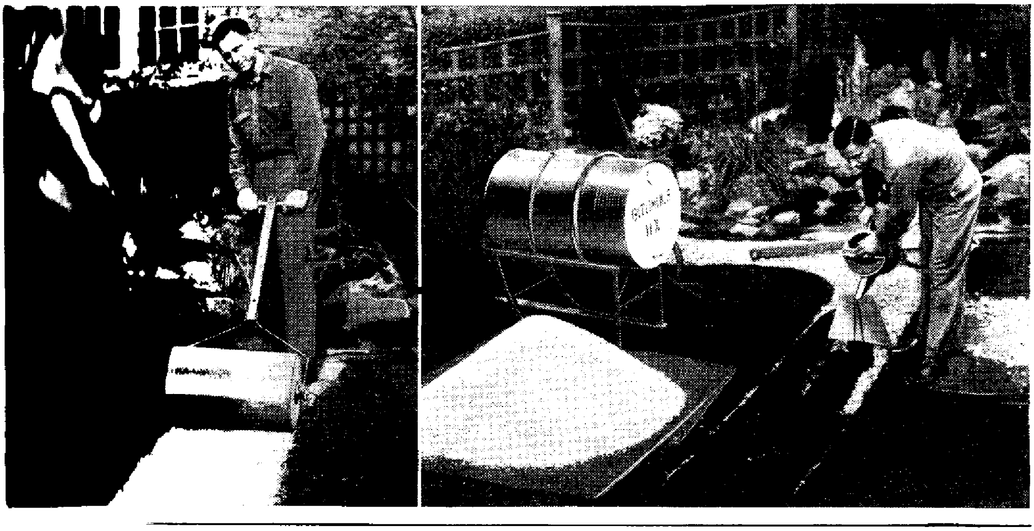
Selling **beverages to workers around docks,** construction crews, or **even** motorists, **keeps the** wolf away from **this man's door. His** dispenser **is clean, home-made.** Coffee **is** carried **on cool days, lemonade or pop during heat waves.**

Running a Rental Library

NUMEROUS housewives, as well as small storeowners, are finding a source of revenue in operating small rental libraries. Only a small space is required, a bookcase comprising six or seven shelves each about five feet long sufficing.

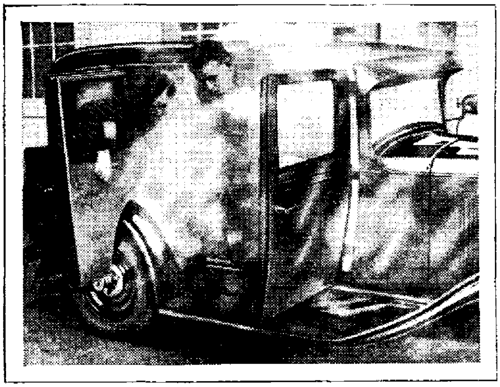
In large cities there are companies which

(Continued on page 132)



Laying garden walks and garage approaches is an uncrowded field of work which this man finds profitable. A two-inch thickness of gravel is laid and an asphaltic binder applied from an improvised watering can to produce a hard surface,

New Developments in the AUTO World



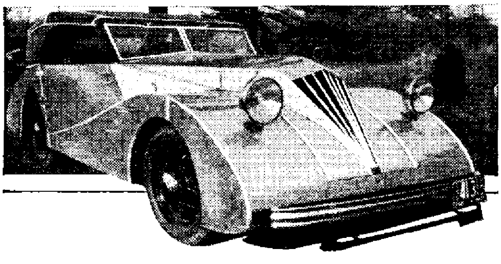
When car thieves attempt to make away with this car, a tear gas bomb. attached to the starter, explodes and drives them out. Owner sets the trap when leaving his auto.

How Cars May Look Century Hence

TWO years ago Emile Fachon, of Rehoboth, Mass., decided he wanted an automobile that was "different." Thereupon he started tinkering around in his cellar and the photo below shows what happened.

The freakishly shaped body, made of aluminum, rests on an 8-cylinder Ford auto chassis. So efficient is the streamlining that there is absolutely no loitering place for wind. The machine has only one seat but it will accommodate the driver and three passengers.

The only trouble, the builder claims, is that he is constantly in danger of being stared at by curious people.

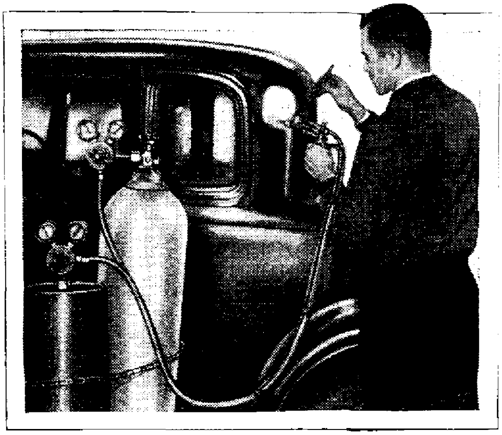


Here's what happened when a mechanic wanted an automobile that was "different." Streamlining increases speed 25 %.

Tear Gas Thwarts Motor Thieves

AUTO thieves are literally gassed out of their hauls by a new type of car-protective device recently introduced in Berlin. When the big bad robber opens the door and gets set comfortably to drive the machine, a tear gas bomb suddenly explodes and he is compelled to make a quick exit. The bomb is connected with the starter and goes off when a switch is turned on by the owner. The photo at left shows what happens when bandits attempt a job.

Solder Spray Fills Body Dents



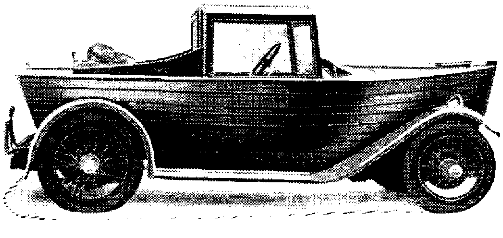
Dents in car bodies are filled quickly and easily with spray of metal solder from gun operated by compressed air.

TO AUTO repair men a new method for filling body dents will prove a great boon. Thanks to the development of a new metal spray it is possible to do finish filling with cool sprayed metal, thus saving time and effort. Solder metal is fed into a special spray gun, as demonstrated above, and a stream of cool metal is then shot into the break. The spray operates from an acetylene tank and compressed air line or from a portable air compressor. Any mechanic can master the process in a few minutes, manufacturers claim, making it unnecessary to remove upholstery from the car and pound out the body dent from inside.

Sea-going Auto With Hull Shaped Body Traverses Rivers Easy as Roads

WASHED-OUT bridges hold no terror for the nautical auto shown in the photo at the right. In such a situation, it would simply run down the bank, traverse the stream and climb up the bank on the other side, and go on its merry way.

This unique bus was one of the feature exhibits at the nautical salon in Paris, France. A small propeller extending out of the "hull" at the rear drives the car through the water when its shaft is hooked to the motor.



This sea-going auto takes to water when and where the occasion arises. Propeller shaft engages motor for water travel.

Suspension Dining Table for Motor Campers' Convenience

HERE'S an automobile table that provides the utmost comfort for motor campers. How it operates may be seen from the photo at the right. The top of the table is a three-quarter inch birch board, 44 in. long and 15 in. wide, with ½"x⅛" slots bored at the four corners. Through these slots are drawn web straps equipped with buckles and French snaps.

The snaps attach to four screweyes in the roof of the car. The buckles make possible the adjustment of the suspended table to the right height. The straps, passing through the slots, are arranged diagonally underneath the board so that, regardless of position of the car, the table may be shifted in the straps to a level position.

Another short strap, passing through a fifth slot at the front side, attaches firmly to the robe rail to steady the table top. When not in use, the table is carried in the space between footrail and back of front seat.

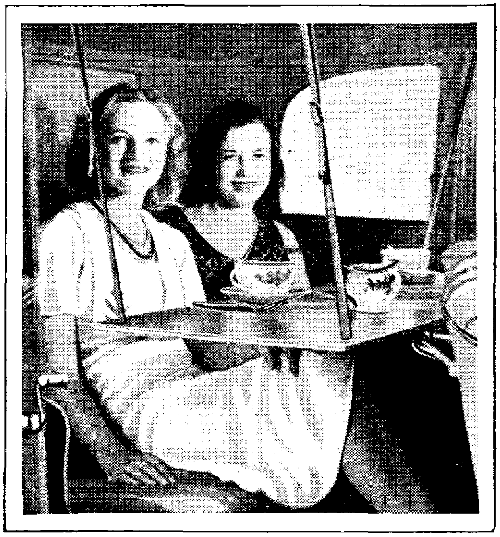
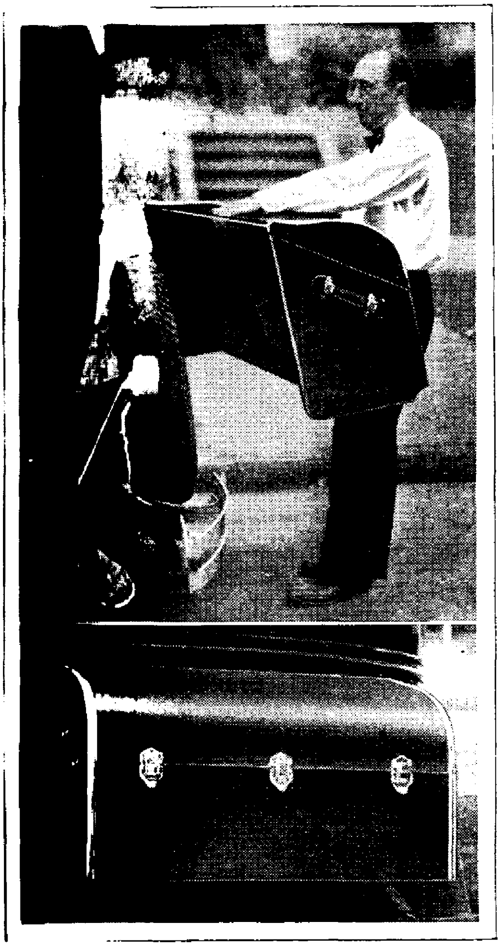


Table is supported by web straps hung from ceiling of car.



Travel chest fits over spare tire and rides without noise.

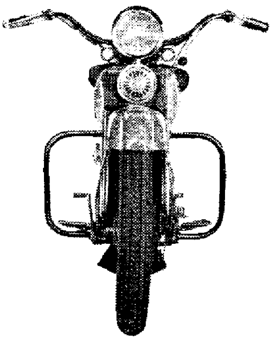
Travel Chest Rides Over Tire

THERE'S a new convenience for motorists in a travel chest now being marketed which fits over the spare tire in the rear. A bolt and one wing nut hold the trunk in place and hold it firmly, as illustrated in the photo at the left. Inside the trunk there is a generous space for luggage, chains, tools, etc. Though it may be set in place or removed with utmost ease, it will not create irritating noises, as it rides on the rubber. The appearance of the car is much improved, for the trunk completely hides a worn spare tire or shabby cover.

Safety Guards for Motorbikes

A MANUFACTURER of motorcycles has just developed and placed on the market a novel set of guards which it is claimed make motorcycling the safest method of power travel on the highways. These guards, as illustrated below, are made of heat-treated tubular steel and are tough and almost impossible to bend or kink. They can be easily and quickly attached to the front of the frame of the motorcycle.

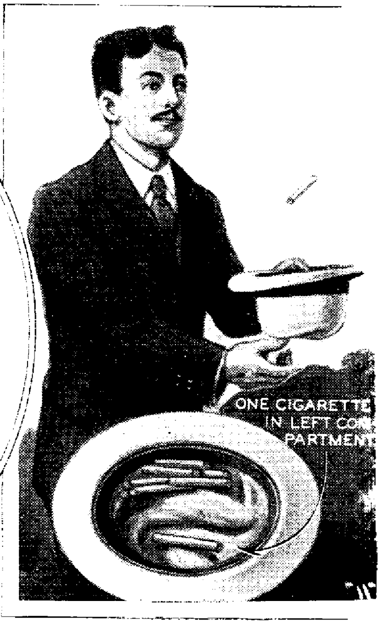
The guards extend out beyond the sides of the footboards and offer maximum protection to both rider and motorcycle in sideswipes and Spills.



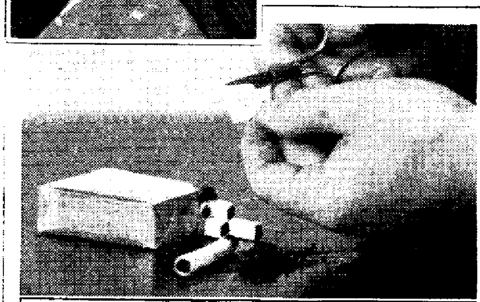
Attached to frame of mudguard, these motorbike bumpers protect the rider in spills.

PARLOR MAGIC with

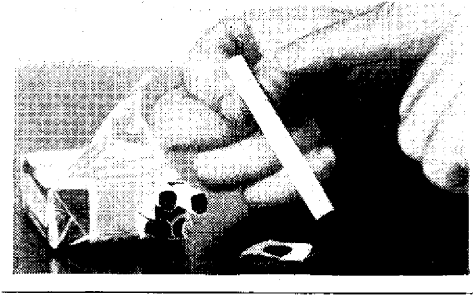
NEW LABEL PASTED ON


ONE CIGARETTE IN LEFT COM-PARTMENT

Upper left shows a doctored cigarette passed to a spectator. It is hard to dete "gimmicking." or the alteration of the brand label. Left shows how the label of say a Lucky Strike, is fastened with saliva over a Camel brand mark. Right, above shows how to put a competing brand of cigarette into hatful of smokes of the same kind and demonstrate ho the numerically superior brand will kick out the intruder The trick is performed by keeping all similar smoke in one side of the hat, and flicking the competit out with the thumb as a loud exclamation is uttere



This shows how a Lucky Strike brand label is cut out ready for sticking over the brand name of a Chesterfield, Old Gold, Camel or other smoke.



By moistening the cut out label with the tongue it will be found to adhere strongly to the other cigarette, and to become dry and be almost undetectably "gimmicked."

IF THE cigarettes themselves could only express the keen competition apparent among their manufacturers . . . well!

Try this: Drop a bunch of one brand smokes into a hat. Take a lone cigarette of another brand and skoot it into the enemy encampment. Bang! Out comes the intruder with much gusto to he deftly caught in your hand. The "how" is absurdly simple. The "bunch" is dropped into the hat taking care that they land in the far compartment of the crown. The lone cigarette goes into the near compartment. What's left is merely a matter of voicing a loud "hang" at the same moment yon snap the crown of the hat with your thumb, projecting the cigarette high into the air. For so simple a bit of foolery, this goes over nicely.

How to Tie a Cigarette in *a* Knot

If somebody asked you to tie a knot in that three inches of paper-covered weed, and that without breaking the aforesaid paper . . . well, you could be easily excused for humming "Crazy People." Nevertheless, the stunt is quite simple. Merely wrap the cigarette in a strip of cellophane, as shown in the picture. You know how to tie the knot. The smoke comes out of the

CIGARETTES

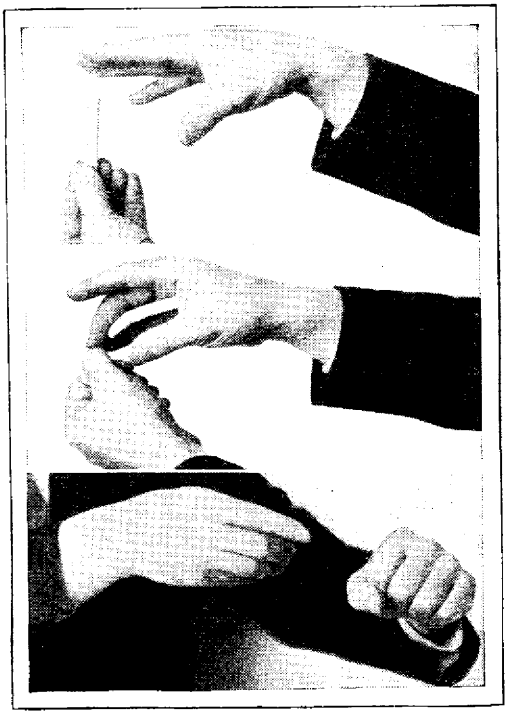
by SAM BROWN

operation a bit limp but otherwise quite smokeable.

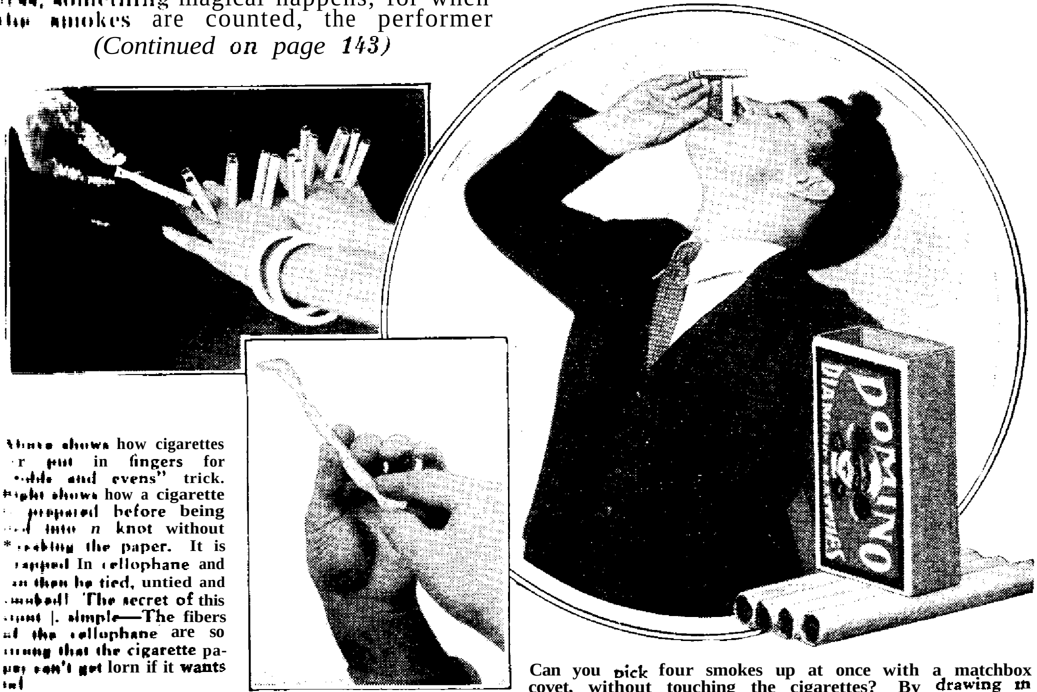
For an odd little conceit, place a Spud, a Chesterfield, an Old Gold, a Lucky Strike and a Camel in that order on a table. Use slips of paper if you like. Now, starting at the Spud end and taking the cigarettes in this order—Camel, Chesterfield, Spud, Old Gold, Lucky Strike—you can spell the name of each cigarette and always end at the brand which is being spelled. The counting—a cigarette for each letter—goes around in regular rotation. Nice of the cigarette people t' fix things up like this, eh what!

Here's a one: Have a spectator place his hands flat on the table. Take two cigarettes. Call attention to this, "two cigarettes, an even number," and then place the pair between any of the openings presented by the spectator's fingers, as shown in the photo. Continue in a like manner until all but one of the openings are filled, always calling attention to "two cigarettes, an even number." Then, take one cigarette, "one cigarette, an odd number," and place this odd cigarette in the last opening. Now, quickly remove the pairs, taking one cigarette of each pair in your right hand and the other in your left. With the odd cigarette left on the table, hand the contents of one hand to another spectator. Then take the last cigarette and add it to your handful, saying, "by the addition of this odd cigarette, I make my pile odd while yours is even." "Right?" "Right." Nevertheless, something magical happens, for when the smokes are counted, the performer

(Continued on page 143)



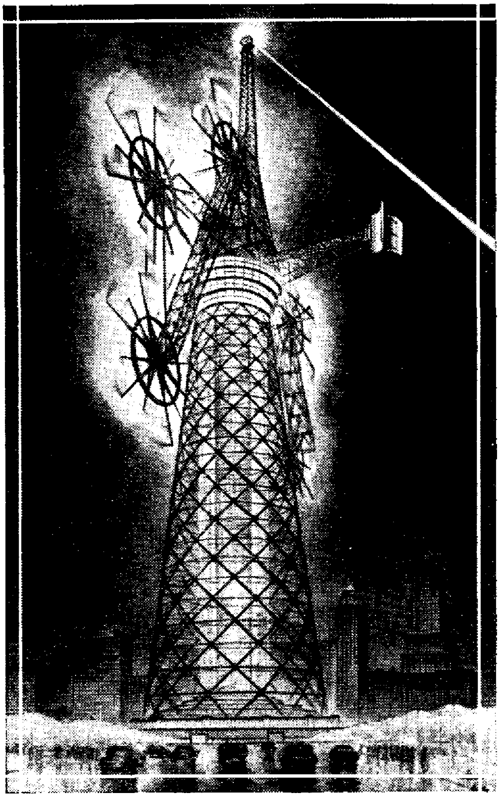
How to palm a cigarette. Hold the smoke upright. Take it in the palm of the hand as shown at center, springing it against the middle finger. It will then spring back into the fist that held it originally.



Above shows how cigarettes are put in fingers for "odds and evens" trick. Right shows how a cigarette is prepared before being tied into a knot without breaking the paper. It is wrapped in cellophane and can then be tied, untied and smoked! The secret of this stunt is simple—The fibers of the cellophane are so strong that the cigarette paper can't get torn if it wants to!

Can you pick four smokes up at once with a matchbox covet, without touching the cigarettes? By drawing in your breath the suction will enable you to do the trick.

World's Largest Windmill to Be Sight of Chicago Fair



Illustrated in this artist's drawing is the *giant* windmill to be erected at the Chicago World's Fair. The five wind wheels will generate approximately one million horsepower.

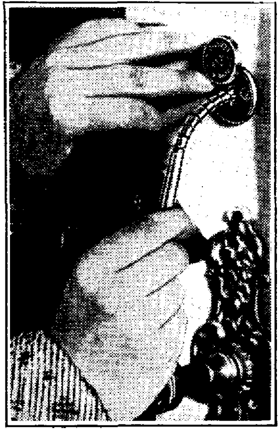
ONE OF the most startling sights which visitors to the Chicago World's Fair will witness is a huge tower supporting five windmill wheels. Atop this tower will be a lofty aerial beacon casting a powerful beam far and wide over the horizon.

An artist's drawing of the proposed project may be seen at the left. The framework of the mammoth tower will be of steel girder construction. At the top of the main tower will be a sight-seeing gallery and a restaurant.

The huge windmill wheels, mounted as illustrated in the drawing, will generate about a million horsepower, chiefly for the purposes of illumination. A rudder mounted on a steel girder will keep the wheel into the wind.

"Dragon Key" Prevents Burglary

A BERLIN inventor has developed a new precision lock with a so-called "dragon key," which has caused a sensation among locksmiths. The key in insinuating itself into the door looks like a snake, as you can see in the photo below. The chief advantage of such a type of key, the inventor claims, is that it makes burglary absolutely impossible. The lock is adaptable to any purpose and proves ample protection for any home. Ordinary methods of lock-picking are useless, since the lock itself is offset some distance from the keyhole.

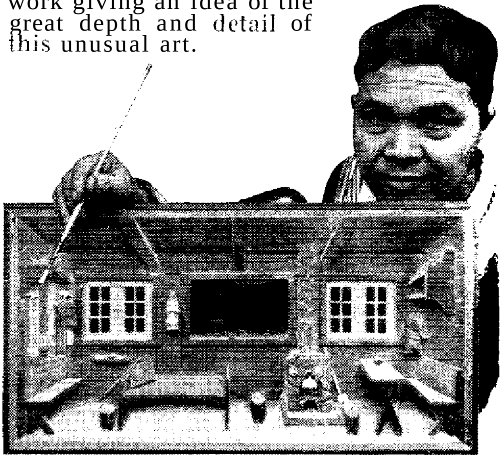


Flexible dragon **key** enters **lock** as illustrated in photo.

Painting in Wood Is Newest Art

A STRANGE century-old Oriental art has recently been introduced in this country by K. Yamanaka, a Japanese of Los Angeles, Cal. It is perspective painting in wood where the artist heightens his distance by constructing his painting in relief and exaggerating his lines of perspective.

In the photo below, Yamanaka is displaying his latest creation, "the Mountain Climber's Cabin," the best example of his work giving an idea of the great depth and detail of this unusual art.



K. Yamanaka, *a* Japanese of Los Angeles, Calif., displaying model of mountain climber's cabin. Note how distance is heightened by exaggerating the lines of perspective.

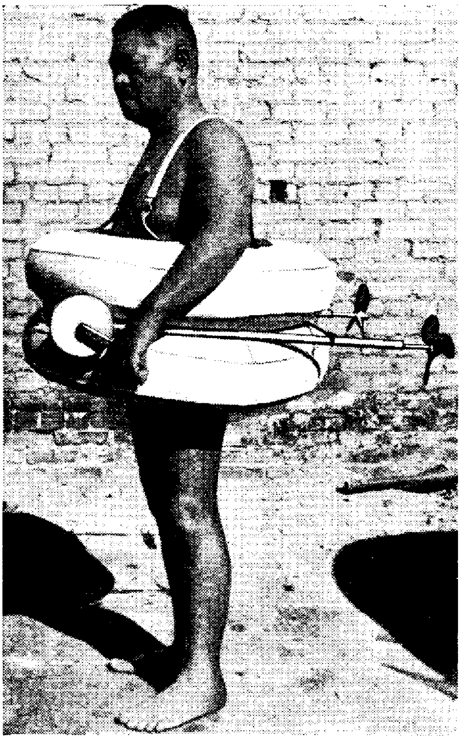
Gov't Urged to Subsidize Health

GOVERNMENT subsidies for fresh vegetables and other foods containing vitamines, instead of for foods like sugar or wheat which usually are lacking in the public diet, were urged recently by a distinguished British physiologist. The necessary vitamines are present in many fresh vegetables, in fresh milk, eggs and butter, in fruits, in meats and in fish and other sea foods. Under the present conditions of industrial depression and unemployment, working people do not get enough of these foods.

New "Twin Screw Life Belt" Saves Victim at 10 M. P. H.

B. NONOMURA, a Japanese lawyer of Los Angeles, had for several years been contemplating a trip to his native country. So remembering his stormy voyage to this country years ago, and being unable to swim, Nonomura turned inventor and at an inventor's exhibit at Los Angeles recently he proudly displayed a new self-propelled life preserver, on which he has succeeded in obtaining patent papers.

Going around the waist and fastening over the shoulders in the regular manner, his preserver has the added feature of twin screws in the rear which are turned by hand with cranks. His device will not only keep the man erect in the water, but can move forward at the rate of ten miles per hour. Mr. Nonomura is seen with his new style life preserver in the photo at the left.



B. Nonomura, Los Angeles lawyer, wearing the life belt which he invented for his trip home to Japan. The twin screws, turned by the hand crank, drives wearer 10 m.p.h.

Deaf Hear Through Head Bone

AN INVENTION for hearing by the conduction of sound through the bony structure of the head instead of through the outer ear was successfully demonstrated recently before the engineering society in New York.

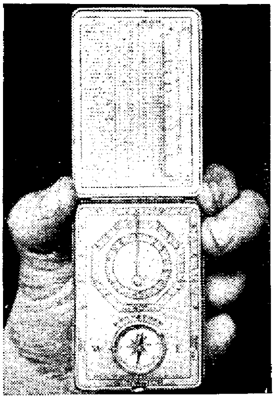
How the contraption is worn is illustrated in the photo below. The heart of the instrument is a special transmitter worn on the clothing which intercepts the words spoken to the deaf or partially deaf person. This transmitter is connected to the oscillator which presses against the bony part of the cranium when the listening is to be done. Ordinarily, however, the oscillator is worn like a necklace around the throat as illustrated in the photo below.

Here's how the new device for hearing through the bony structure of head works. Transmitter is worn in concealed position, while oscillator is held ready for use on necklace.

Pocket Sunwatch for Wanderers

A VERY useful article for the hunter, camper, or woodsman is a new sunwatch, which is a combination sun dial and compass that enables the user to tell the time of day with a few simple mental computations. The calculations are made from a table of latitudes and longitudes carried inside the watch cover.

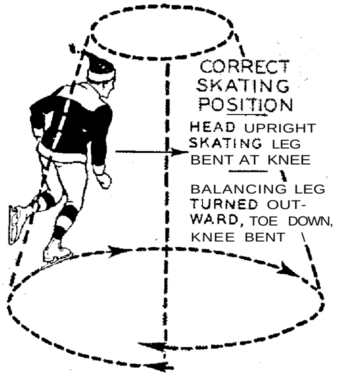
Called a "sunwatch," the gadget fits inside any vest pocket, and is particularly valuable to those in the open in giving direction and time, where an accident of forgetfulness means that a timepiece has been lost or stopped, and where knowledge of time may be of especial importance.

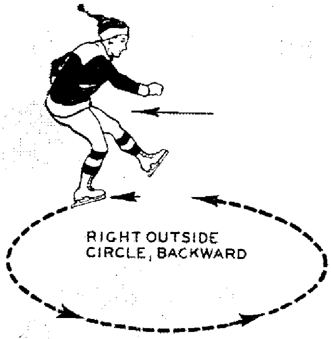


Time is computed from position table on vest-pocket sunwatch.

MECHANICAL Secrets

Here are four professional skaters, the secrets of whose profession are told below. Practice makes perfect here if you master the simple figures first then proceed to more complicated ones, which are simply elaborations of the former.


CORRECT SKATING POSITION
HEAD UPRIGHT
SKATING LEG BENT AT KNEE
BALANCING LEG TURNED OUTWARD, TOE DOWN, KNEE BENT


RIGHT OUTSIDE CIRCLE, BACKWARD

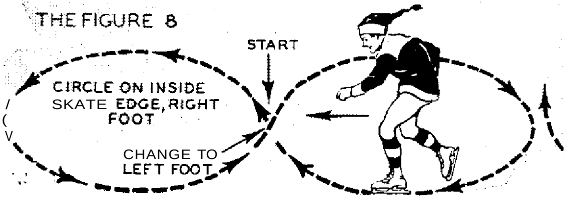
IT IS very easy for the ordinary skater to perform those intricate and fascinating figures on ice, and enjoy to the full the "Poetry of motion," as this most beautiful and graceful of winter sports is called.

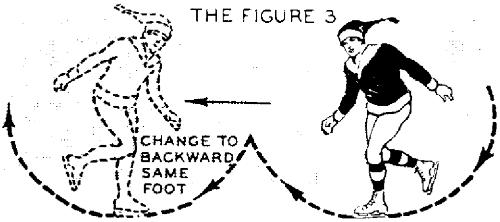
In order to help you to enjoy to the full this rare recreation, we shall set down a few simple rules to guide you in cutting the different figures. First, you need special skates. Either the "Arena" or the "Carnival" skates, with special blades, hollow ground to scientifically correct radius, and special saw-tooth toe for performing spins and whirls on ice.

Your skates should extend to the front edge of the toe and project back a little past the heel. The curve from toe to heel is a matter of choice. The skate should carry the weight of your body under the ball of the foot, not on the heel. Experts select models with higher stanchions under the heel, to give the forward balance, as a runner is poised on one foot.

Fancy, or figure skating, calls for very long, sure strokes, the skater making as many figures as possible while on one foot, since it is impossible to travel very far, or make many figures, by use of short, choppy strokes.

The average speed skater works too fast and too hurried. In fancy skating take your time, make the figures large and deliberately, and practice skating on one foot. It is wrong to keep both feet on the ice, but keep one foot off the ice as long as possible, while practicing long


THE FIGURE 8
START
CIRCLE ON INSIDE SKATE EDGE, RIGHT FOOT
CHANGE TO LEFT FOOT


THE FIGURE 3
CHANGE TO BACKWARD SAME FOOT

Your first step in becoming a proficient figure skater is to master the correct skating position illustrated in top drawing. When you can perform the circle, practice on the figure 8 and the figure three, which involve only simple motions.

ets of FIGURE SKATING

curves, and thus learn the difficult balances of one-foot skating.

Correct carriage of the body makes for graceful figure skating. Hold the head upright, and from the start learn not to look down at the ice; simply glance down now and then. Bending at the waist is necessary in making several figures, but quickly snap out of the position.

The skating leg is bent at the knee, both at the beginning of a stroke, in attaining momentum to make the figures, and during the stroke. The balance leg, with the knees well apart, is turned outward and the toe pointed downward, by use of the hip and ankle muscles, the knee always bent, about the same as the skating leg.

In figure skating the curve of the stroke is done on the four edges of the skate—outside and inside forward; outside and inside backward.

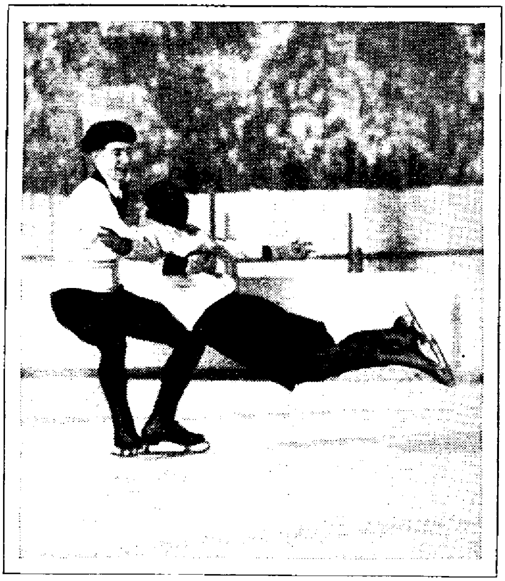
Continual practice and mastery of plain circles, at least 10 feet in diameter, both forward and backward, skated on all edges, starting right and left foot, for the different figures, consist simply of turns on a circle or change of edge.

Start with four plain edges and master each in turn, starting from "rest." If you stand on the left foot, the whole momentum needed to complete the figure must be gained by one stroke or thrust from the side of the right skate, with no suspicion of a previous stroke. Take the stroke from the side and not from the toe of the skate. This starting stroke, powerful enough to carry the skater through the figure, is one of the most difficult to master, but it should be persisted in until mastered, since it is the basis of graceful figure skating.

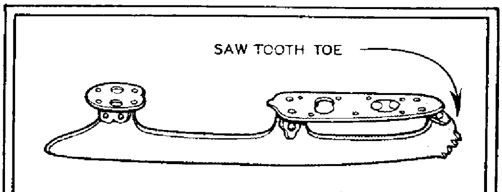
Expert figure skaters recommend that the beginner should acquire the habit of practicing in the same manner as used in competitions, skating each figure three times on alternate feet without stopping.

After mastering the four edges the skater should practice the various figures illustrated in the drawings. The forward circle is easy and should be mastered first, followed by the backward circle. Next try the figure 8 and the figure 3.

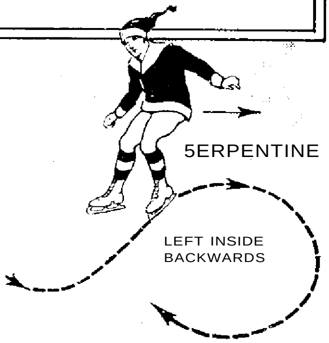
These can be followed by the inside edge forward, the outside edge forward and the serpentine.

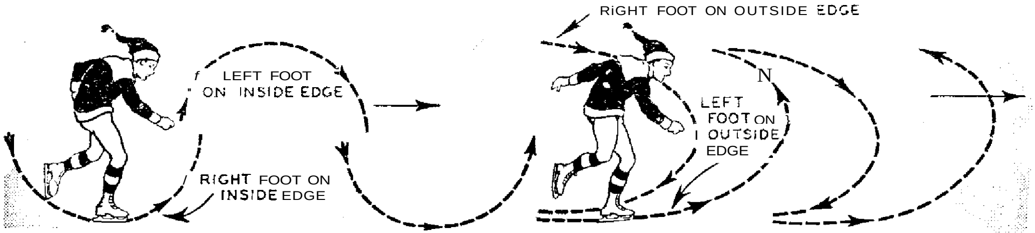


Here's *a* stunt for advanced skaters. The lady is grasped around body and swung 'round and 'round by her partner.



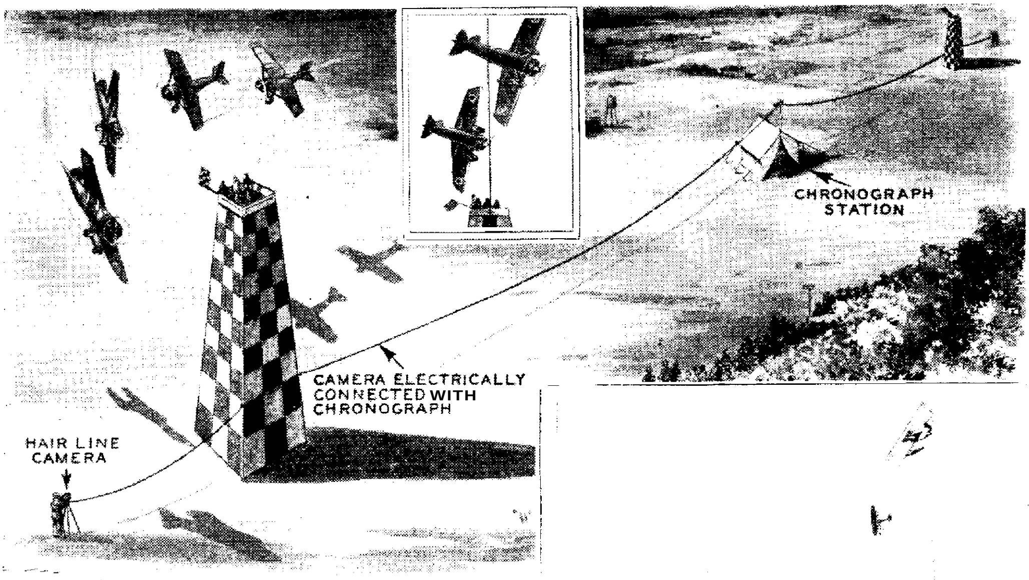
For fancy skating you need specially constructed skates. Experts select models with higher stanchions under the heels to give *a* forward balance. The shoes should be a good fit, tightly clasping the foot, to support the muscles when you spin or whirl. The tongue should have a slip-in pad.





Here are three more fancy steps for the beginner. Note that in the figure at left the inside edges only are used, while in figure at right only outside edges of skates are used. The serpentine backwards utilizes the left inside edge of skate.

Split Seconds for "Error-proof" Air Records


CHRONOGRAPH STATION
CAMERA ELECTRICALLY CONNECTED WITH CHRONOGRAPH
HAIR LINE CAMERA

Here's how the timing mechanism is set up for the speed record races. When cameraman clicks shutter, the chronograph records the time. Inset shows photo with hair line.

ROARING down the final lap of the measured course at the 1932 air races, Jimmy Doolittle not only broke all speed records—averaging 294.386 miles, 16 miles better than the official land plane speed record—but he also put through a severe test a new timing device designed to remove all controversy concerning air speed records.

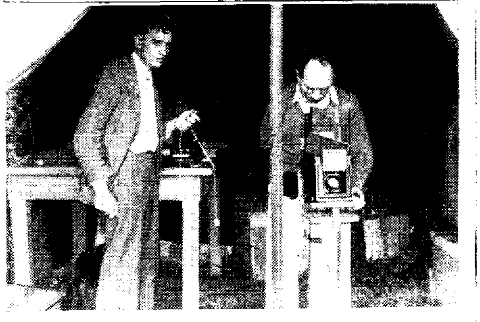
The device, which actually splits seconds a hundred ways for "error-proof" air records, works like this. Assuming that a certain plane is attempting to break a world's record over a standard 3 kilometer course. Some 600 feet from the pylons at the starting and finishing lines, and parallel to them, the "second splitting" mechanism is set up.

How Errors Are Eliminated

This device consists of two hair line cameras with focal plane shutters and a chronograph, all electrically connected as illustrated above. The snapping of the camera shutter automatically closes the electrical circuit which operates the chronograph. This latter instrument is nothing more than a time printing device that stamps the time of the click on a revolving paper tape a little wider than a ticker tape.

The chronograph reads in terms of minutes, seconds and hundredths of seconds. From the developed photo, showing the plane with reference to a hair line, the photographer, by a simple mathematical process, determines the exact second the plane was in position over the starting or finishing line, and calculates the precise speed from that evidence.

Positions of these planes rounding the pylons at Washington, D. C., races show difficulty authorities might have in timing planes by clocking method.



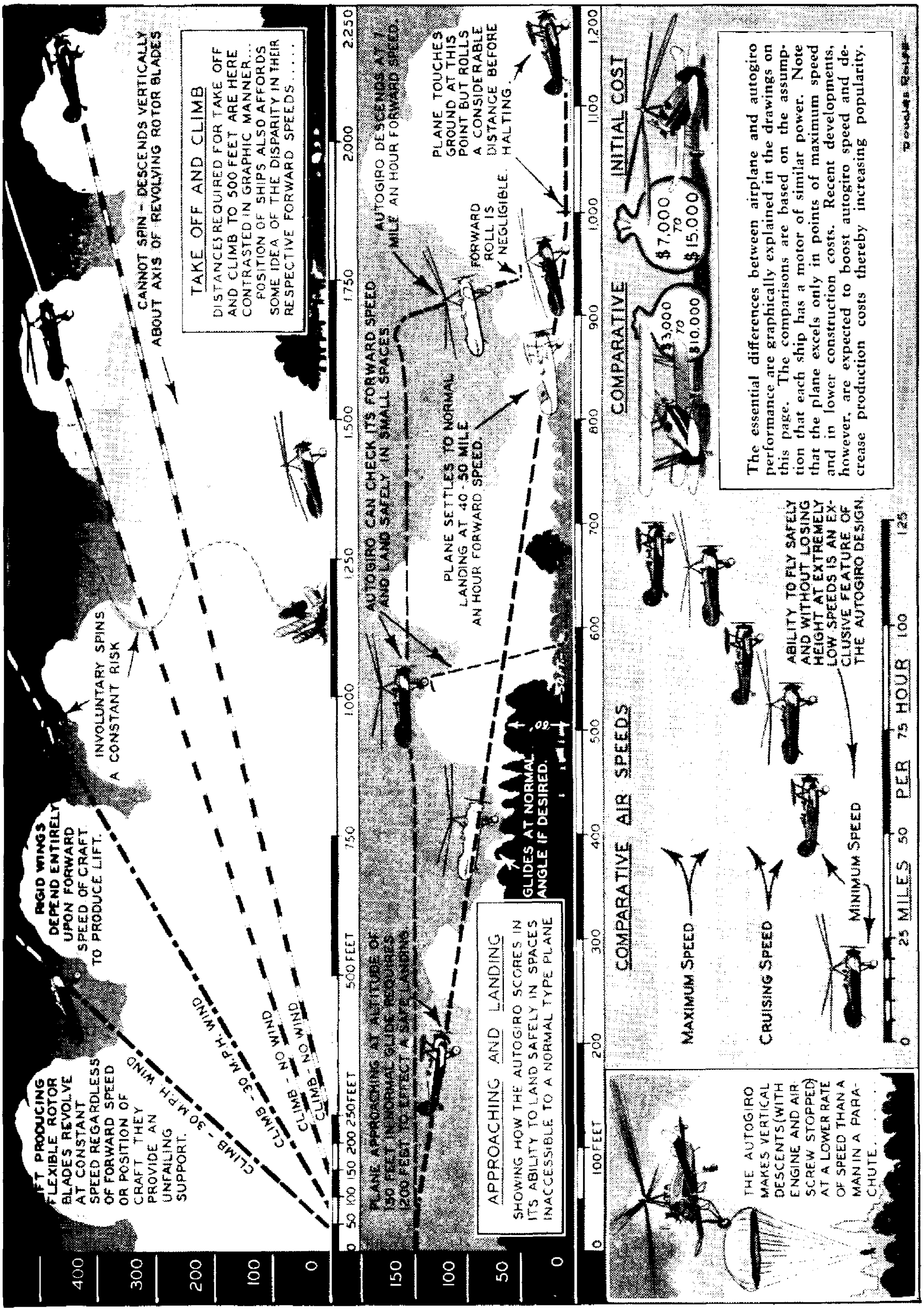
Camera set up in tent facing the pylon ready to snap photo of the planes as they round the pylon. The hair line cameras have focal plane shutters and are electrically connected with the chronograph set between stations.

Birds Hear Far-away Explosions

NEW evidence that birds have some mysterious sense which makes them able to detect powerful sound waves coming from enormous distances, is reported.

When test explosions were set off in Holland, at most of the experiment stations in Great Britain neither human ears nor delicate instruments detected anything. From one British locality, however, came the report of a sudden disturbance among birds at the exact minute when the distant sound waves should have been arriving.

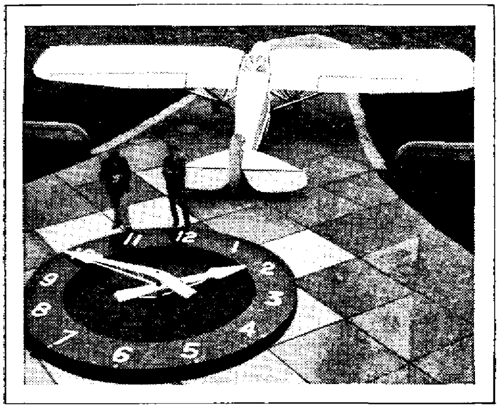
The Why of AUTOGIRO Superiority


TAKE OFF AND CLIMB
DISTANCES REQUIRED FOR TAKE OFF AND CLIMB TO 500 FEET ARE HERE CONTRASTED IN GRAPHIC MANNER... POSITION OF SHIPS ALSO AFFORDS SOME IDEA OF THE DISPARITY IN THEIR RESPECTIVE FORWARD SPEEDS . . . .
CANNOT SPIN - DESCENDS VERTICALLY ABOUT AXIS OF REVOLVING ROTOR BLADES
INVOLUNTARY SPINS A CONSTANT RISK
RIGID WINGS DEPEND ENTIRELY UPON FORWARD SPEED OF CRAFT TO PRODUCE LIFT.
FT PRODUCING FLEXIBLE ROTOR BLADES REVOLVE AT CONSTANT SPEED REGARDLESS OF FORWARD SPEED OR POSITION OF CRAFT THEY PROVIDE AN UNFAILING SUPPORT.
CLIMB - 30 M.P.H. WIND
CLIMB - 30 M.P.H. WIND
CLIMB - NO WIND
CLIMB - NO WIND
400
300
200
100
0
0 50 100 150 200 250 FEET
500 FEET
750
1000
1250
1500
1750
2000
2250
APPROACHING AND LANDING
SHOWING HOW THE AUTOGIRO SCORES IN ITS ABILITY TO LAND SAFELY IN SPACES INACCESSIBLE TO A NORMAL TYPE PLANE
PLANE APPROACHING AT ALTITUDE OF 150 FEET IN NORMAL GLIDE REQUIRES 1200 FEET TO EFFECT A SAFE LANDING.
GLIDES AT NORMAL ANGLE IF DESIRED.
AUTOGIRO CAN CHECK ITS FORWARD SPEED AND LAND SAFELY IN SMALL SPACES.
PLANE SETTLES TO NORMAL LANDING AT 40 - 50 MILE AN HOUR FORWARD SPEED.
AUTOGIRO DESCENDS AT 1 MILE AN HOUR FORWARD SPEED.
FORWARD ROLL IS NEGLIGIBLE.
PLANE TOUCHES GROUND AT THIS POINT BUT ROLLS A CONSIDERABLE DISTANCE BEFORE HALTING.
150
100
50
0
0
100 FEET
200
300
400
500
600
700
800
900
1,000
1100
1,200
THE AUTOGIRO MAKES VERTICAL DESCENTS (WITH ENGINE AND AIR SCREW STOPPED) AT A LOWER RATE OF SPEED THAN A MAN IN A PARACHUTE.
COMPARATIVE AIR SPEEDS
MAXIMUM SPEED
CRUISING SPEED
MINIMUM SPEED
ABILITY TO FLY SAFELY AND WITHOUT LOSING HEIGHT AT EXTREMELY LOW SPEEDS IS AN EXCLUSIVE FEATURE OF THE AUTOGIRO DESIGN.
0
25
50
75
100
125
MILES PER HOUR
COMPARATIVE INITIAL COST
$3,000 TO $10,000
$7,000 TO $15,000

The essential differences between airplane and autogiro performance are graphically explained in the drawings on this page. The comparisons are based on the assumption that each ship has a motor of similar power. Note that the plane excels only in points of maximum speed and in lower construction costs. Recent developments, however, are expected to boost autogiro speed and decrease production costs thereby increasing popularity.

Superior climb of the autogiro is revealed in the fact that in *30-mile* wind it can climb to altitude of 500 feet in space of 100 feet, while the plane requires 1000 feet, and then is in danger of going into a spin. Compare also landing speed.

AIRPORTS *Modernize with Huge Clocks*



Progress made in aviation is further made apparent when efficiency experts for the Heston airfield deem it necessary to install *a* huge clock for convenience of rushing passengers.

FROM the dusty tarmacs of yesteryear, where gophers dodged and the meadow lark sprang affrighted from the thunder of old Jennies, down to the tiled airfields of today is a far cry. And a big advance to be made in so few years.

Here is a photo which graphically and dramatically depicts what a huge change has come about in aviation. Heston airport, the municipal airport of the City of London, where all the cross channel European planes check in and out, has installed a huge clock so that incoming or passing planes may see immediately their time of arrival.

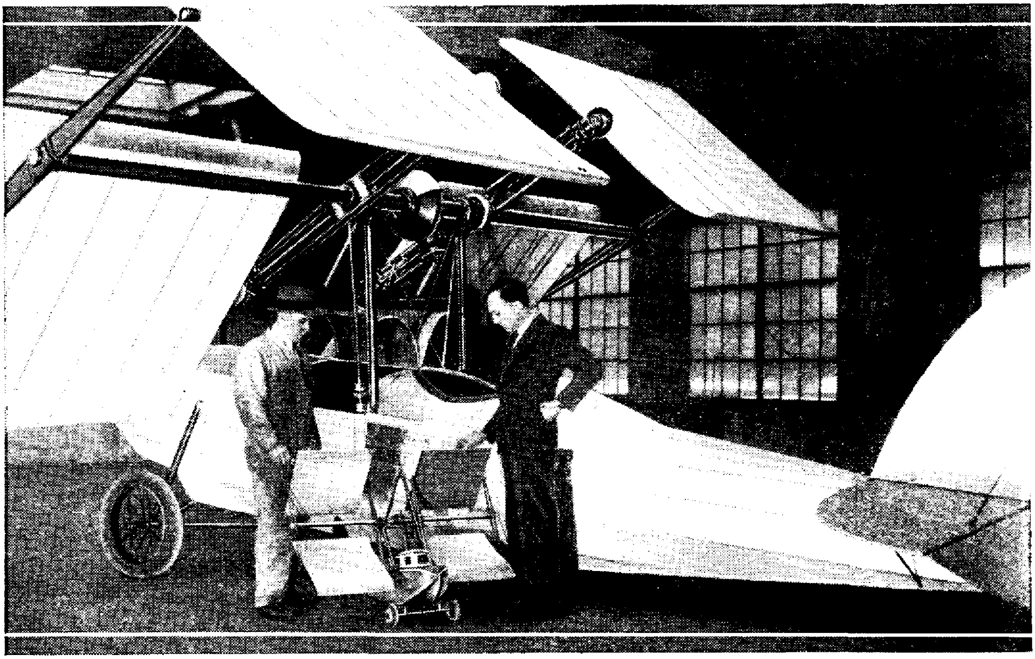
The clock is built at the confluence of the tarmac and the hangar apron, and is 20 feet in diameter. It can be seen from 1500 feet. Note the tiled apron hangar. The clock is driven by an electric motor, synchronized in same way as a household electric clock.

New Propellerless Plane Flies Forward or Backward **and Goes** Straight Up

A NEW type of plane which can rise vertically and fly forward or backward, or hover in the air was successfully tested the other day in New York. It is the invention of William Rahn, right, in photo below, who constructed the craft with the collaboration of Gus Miller, left, formerly with the Zeppelin works in Germany.

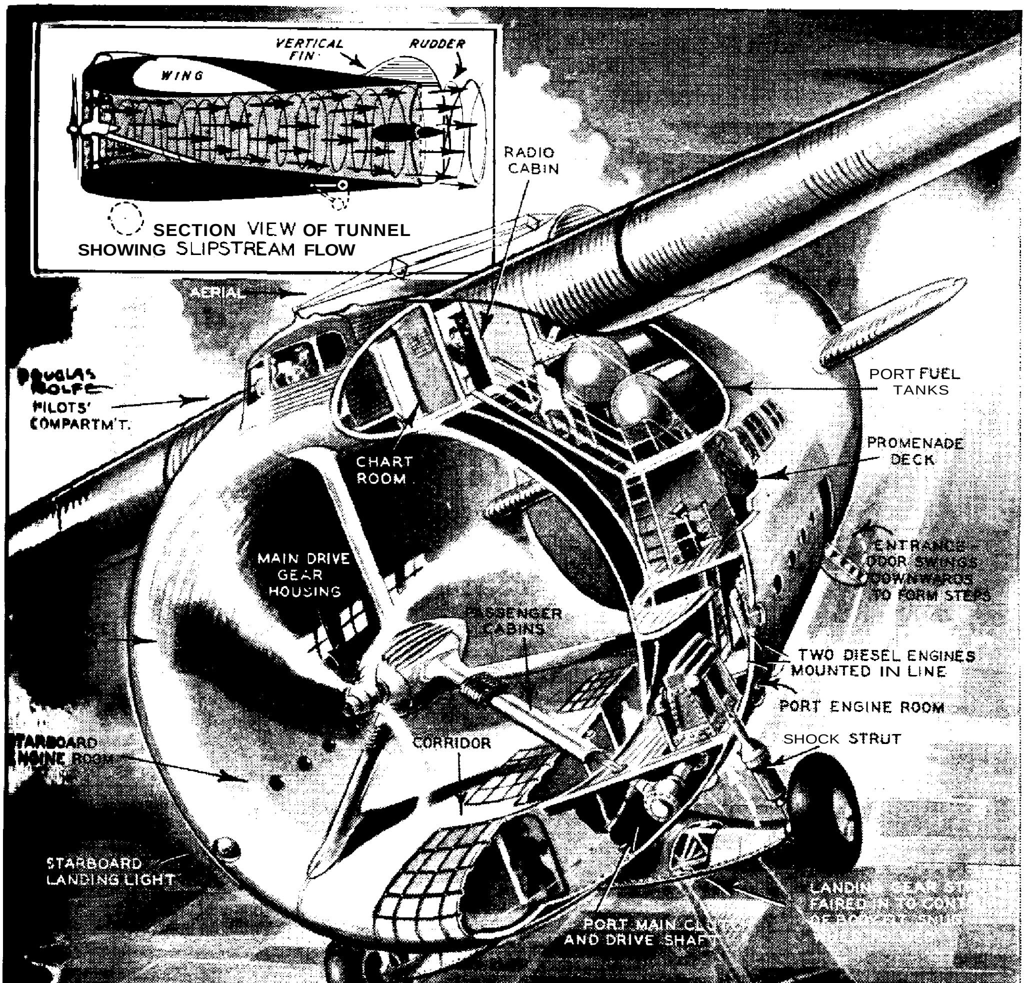
The strange looking sky hopper is powered with a Wright Whirlwind motor and is said to be capable of a speed of 135 miles per hour.

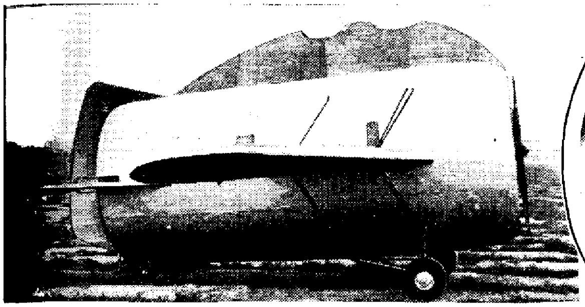
While this is a news flash and no further details are at this time available, the principle seems to be sort of an "autogyro on the flat." The wings are disposed about a central axis and apparently change their incidence so as to produce both lift and negative drag which hops the ship along, Possibly the tests were not successful, for nothing further seems to have startled the world from this source, although a plane of these characteristics would certainly set the world on its ear, so to speak.

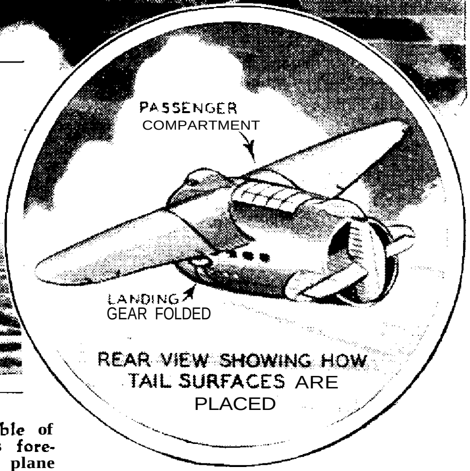


William Rahn, right, and Gus Miller of New York City, have invented a new type of airplane which will rise vertically, hover, and fly forward or backward, so it is claimed. They are shown examining a model of the novel plane.

Flying BARREL to Carry 100 Passengers


VERTICAL FIN
RUDDER
WING
SECTION VIEW OF TUNNEL SHOWING SLIPSTREAM FLOW
RADIO CABIN
AERIAL
DOUGLAS ROLFE
PILOTS' COMPARTM'T.
CHART ROOM
PORT FUEL TANKS
PROMENADE DECK
ENTRANCE DOOR SWINGS DOWNWARDS TO FORM STEPS
MAIN DRIVE GEAR HOUSING
PASSENGER CABINS
TWO DIESEL ENGINES MOUNTED IN LINE
PORT ENGINE ROOM
STARBOARD ENGINE ROOM
CORRIDOR
SHOCK STRUT
STARBOARD LANDING LIGHT
AND DRIVE SHAFT

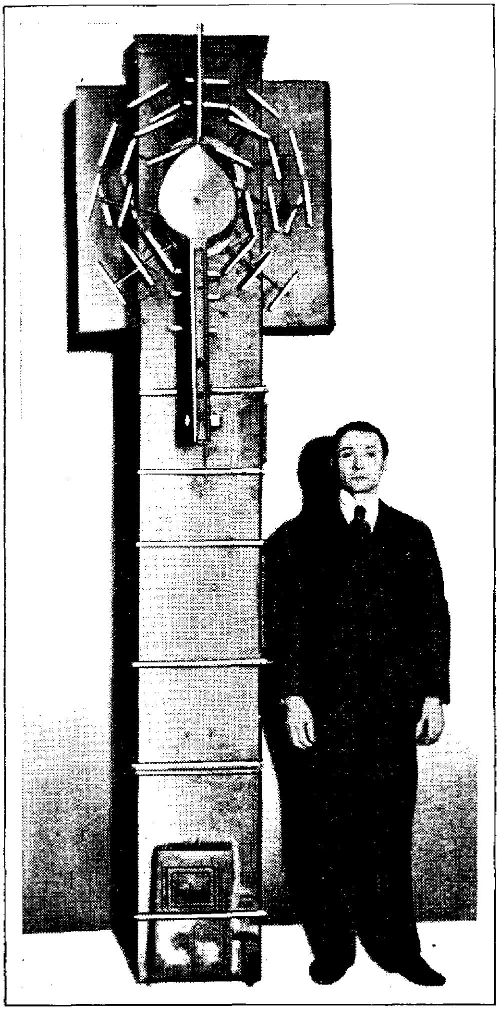



PASSENGER COMPARTMENT
LANDING GEAR FOLDED

REAR VIEW SHOWING HOW TAIL SURFACES ARE PLACED

Development of a huge "flying barrel" transport plane capable of carrying a hundred passengers inside its thick tubular hull is foreshadowed by recent successful test flights of the hollow fuselage plane shown in the photograph directly above, designed by Engineer Stipa of the Italian Caproni works. The picture shows double cockpits placed on top of the cylindrical body, but in the refined version of the plane for large scale passenger traffic, the piloting compartment is faired into wing and propeller is driven through gears much like the dirigible Akron.

Cans Lift Up Water Column in Perpetual Motion Engine



French inventor, M. Miralle, with perpetual motion machine of his invention. Chimney is filled with water, up through which move metal chambers from which air is exhausted.

THE latest in perpetual motion machines is a fuelless engine devised by a Frenchman of Paris, M. Miralle. The contraption functions on an application of Archimedes' principle of floating bodies, and consists of a sort of thick set chimney made of sheet iron and equipped with fifteen flywheels.

The machine is set going by turning one of the flywheels about fifteen revolutions, which subsequently sets the remaining wheels in operation. Over these wheels passes an endless chain fixed in the interior of the chimney like a motor, in which is also a series of chambers made of vegetable cans.

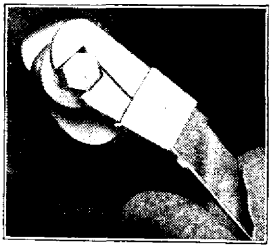
The chimney is filled with water so that the chamber and the endless chain are submerged in the liquid. One of the columns of chambers contains water and the other, through a process known only to M. Miralle, is filled with air. The air-filled chambers tend to rise to the surface of the water-filled chimney, thus setting the motor in motion. The photo shows M. Miralle standing beside his invention.

U. S. Time World's Most Accurate

UNITED STATES time is the most accurate in the world. In a recent international comparison the United States signals sent out from the Arlington radio station were found to be accurate to .0078 second.

The U. S. Navy's Observatory precision clocks are kept in a small underground room itself supported inside another room. Both rooms are sealed, waterproofed and insulated against heat or cold. Inside the inner room neither the temperature nor the air pressure varies all year long. Nor is anyone allowed to enter this room for even the tiny amount of heat radiated by a human body might alter the precision with which the clocks beat out the seconds. The stars are the only perfect timekeepers known, and their motion is world's time-standard.

4-Piece Wrench Quickly Adjusted

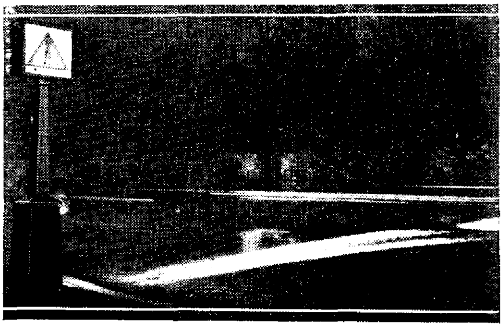


Four piece wrench has jaw which takes hold automatically.

A NEW wrench now on the market consists of only four parts and is adjusted instantly to fit any size nut simply by sliding a collar. When pressure is applied against the jaw in turning a nut, a wedging action locks the collar in place securely.

Street Crossings Now Illuminated

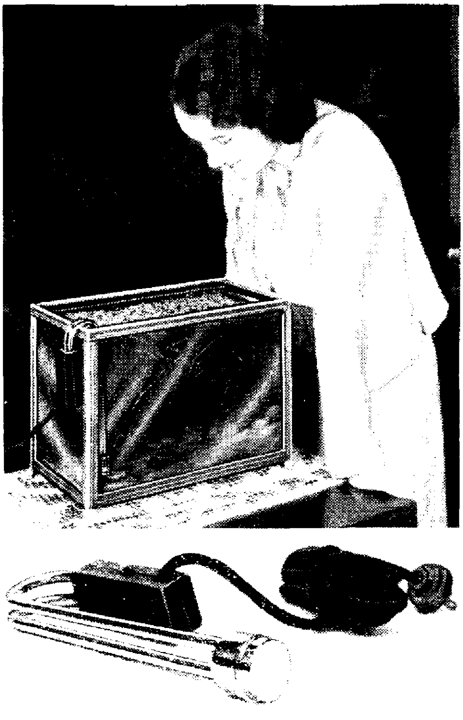
AN APPARATUS which throws a beam of light across the pavement to warn passing motorists that pedestrians are about to cross, was introduced in Paris, France, recently. When a pedestrian is ready to cross, he presses a button on the post and his path is lighted for the small period necessary for crossing.



Light mounted on standard throws beam across road to illuminate path for pedestrians. Accidents are thereby reduced.

New Aquarium Heater Keeps Water at Right Temperature

With the use of an aquarium heater recently introduced, it is possible for tropical fish to enjoy a home up north without the usual dangers of overheated or cold water. This new heating appliance is constructed with the famous built-in-[illegible] thermostat, which automatically controls the aquarium temperature. The heating element is enclosed in a small chromium plated copper tube and is about eight inches long. It is installed by plugging the cord in a convenient outlet and hooking the heater over the side of the aquarium.



Hooked over edge of aquarium, this electric warmer has thermostat control to keep water at correct temperature.

You'll Catch Cold in Any Climate

AVERAGE Americans have three colds each year, more or less regardless of where they live or what they do about it. These colds come in waves, sweeping over a community or even over the whole country much as does an influenza epidemic, although far less fatally. The most colds occur between September and March but there is no consistent peak during this period, the time of most numerous colds in any one locality being determined by the ebb and flow of the epidemic waves mentioned.

Preserves Newspapers Forever

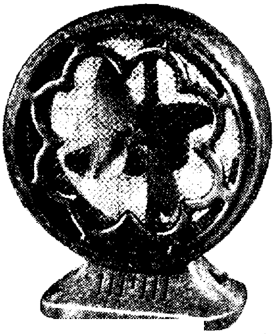
NEWSPAPERS which have been filed away for future reference have a way of aging rapidly and reaching their period of decay early in life.

To preserve these papers over a greater length of time, or forever, as the inventor claims, a new paper treating process has been developed which preserves the sheets safely against the ravages of time. A special coating of transparent material is laid over the sheets which seals them hermetically against the air but permits them to be read.

Newspaper pages are preserved forever against the ravages of time by a special coating of transparent material.

Heater Fans Warmth Thru Room

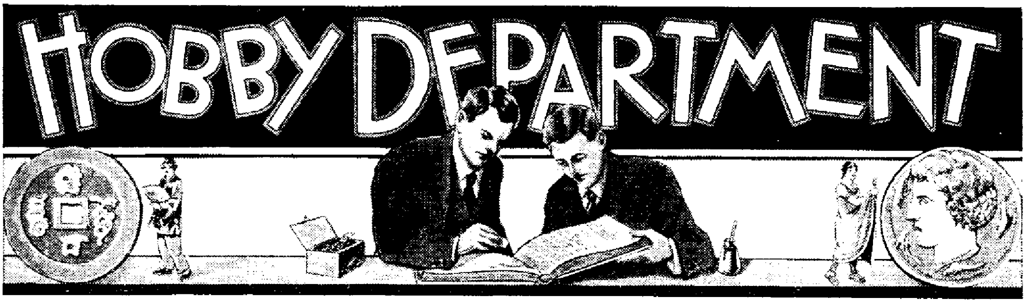
IDEAL for chilly mornings as well as for hot summer days is a combination fan and heater recently placed on the market. The device comprises a thermostatically controlled heater unit and a slow moving fan to circulate the heat throughout the room as it is generated. When a special switch in the base is snapped in one direction, the 1000 watt heating coil and the fan turning at slow speed is cut into the circuit, but when the switch is thrown the opposite side, the heating element is cut out and the fan speeded up for cooling in summertime.



Warmth from heating element is distributed in room by the fan.

Thermostat control is provided for maintaining the room at a constant temperature when the fan is being used as a heater. A thick mesh screen covers the blades and elements to guard against burns or clips on the fingers.

HOBBY DEPARTMENT



GREETINGS *to hobbyists! We hope that you will like this new Hobby Department which will be a regular monthly feature of* MODERN MECHANIX AND INVENTIONS, *beginning with this issue. If we do not touch on the subject of your particular hobby, write in and tell us about it. We want your help in making this feature one of broad appeal to collectors and hobbyists. Stamp and coin collecting probably interest more people than all other hobbies combined, but these pages will also reflect the activities of collectors of firearms, first editions, antiques, match box covers—in fact, anything under the sun that makes a virile appeal to the collecting instinct. If you have a unique hobby, write the Hobby Editor and tell him about it; if you have scored a coup in capturing a rare stamp or coin, tell him about that, too. If your account is used in the department you'll be rewarded with a check at regular rates.*

The Geography of Stamps

THE temptation to hide an adventure magazine inside the large pages of a geography when teacher isn't looking doesn't exist for the student who happens to be a stamp collector. If he has seen some of the beautiful new stamp issues from tropical countries whose very names breathe glamor and romance, he will find geography the most fascinating of studies.

Four of the most striking recent examples are reproduced in the photograph below, and are particularly interesting because of their reproduction of native types. From an ethnological point of view the stamps shown are especially valuable through their selection of typical subjects showing racial characteristics of the particular native races. African issues of this description are particularly numerous, excellent examples having been put out by the Belgian Congo. Ruanda-Urundi, Algeria, Tripoli, Liberia, Gabon, French Sudan, and Madagascar. Beautiful specimens have also been issued bv New Zealand, North Borneo, Cook Islands, North Mongolia, French Guiana, British Guiana, Dutch Guiana, Rarotonga, and Jamaica.

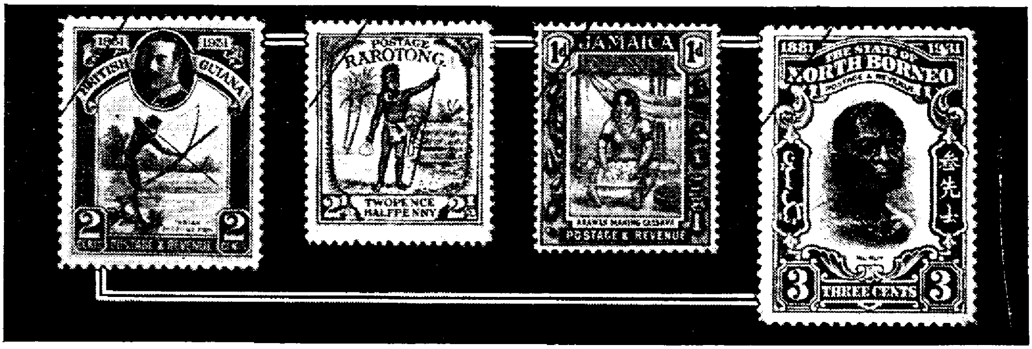
How many of these countries can you place? If the location of more than one or two is unfamiliar to you, the chances are a hundred to one that you are not a stamp collector, for it's next to impossible to stump an enthusiastic philatelist on a question of geography.

Those who are indifferent to the appeal which stamps make to the student will find the sheer beauty of the crisp steel-engraved stamp pictures irresistible. Printed in brilliant colors, glowing with a vitality which only the steel-engraving process can impart, the thumb-nail stamp portraits win an undisputed place in the world of art on their own merits.

New Stamp Issues

AMONG the more recent new stamp issues of interest to collectors are the seven new Canadian examples, six of which bear a medallion head of King George, the seventh being a 13 cent double-sized pale purple pictorial bearing a picture of the old Quebec citadel. Other denominations are 1c green, 2c brown, 3c red, 4c bistre,

(Continued on page 143)



Striking examples of the postage stamp as an instructor in ethnology, the study of races, are presented above. An Indian shooting fish, a Rarotongan chief, an Arawak making cassava, and a head of a Murut are shown, left to right.

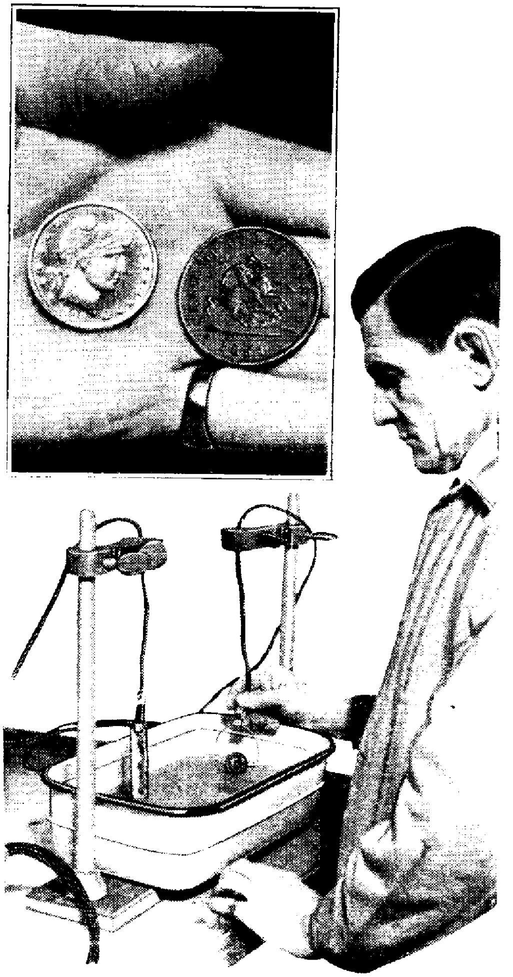
New Process Restores Dull, Dirty Coins to Proof Condition

FIVE chemical baths, supplemented in extreme cases by electrolysis in a chemical solution, restore to "proof condition" even the dirtiest coins. A new process, using chemicals which he compounds under heat, has been devised by John Cowles, California chemist and metallurgist.

In his "beauty laboratory," Cowles and his associate, Horace A. Stoddard, have recently restored many old coins which in the past could not be cleaned. One $50 gold piece attained a value of $1,000 after its brilliance had been restored. Some 2,000 coins, ranging in minted value from one cent to $50, have had the tracks of time removed.

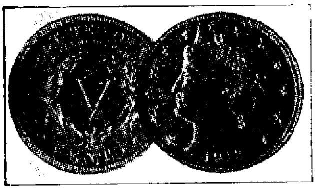
Nowhere else does such a laboratory exist, for the art of restoring coins is new. Mr. Cowles neither adds *nor* subtracts anything in the process of restoring the natural appearance of metals which have become oxidized, tarnished, discolored or slightly scratched. He first examines each piece under a microscope to determine how deeply into the surface rust has eaten or scratches have penetrated. Upon this examination depends the strength of the chemical solutions to which the piece will be subjected. In case the chemicals are not strong enough, he "boosts" their action by electrolysis. During the cleansing process he cleans off the fingerprints and dead rouge deposited by time without injury to the original metal.

Coin collectors value fresh looking coins more than tarnished pieces. A $3 gold piece minted in 1<S73. if tarnished, is worth $75; in "proof condition" its value increases to $300. Proof coins are those struck off by the treasury department for expert examination, not for general circulation, and collectors value them highly. They take great pains to retain the original glow, but in time all coins fade. Mr. Cowles is the first man to restore their original lustre without losing some part of the metal, he says. So widespread has become the habit of coin collection that the practice has become a science—numismatics—and Mr. Cowles' laboratory is authorized by the government to restore coins.



By a process of electrolysis and chemical solvents, dull, dirty coins can be restored to proof condition for collectors. Insert picture of hand shows restored coin at left.

Have You a Nickel Worth $50?

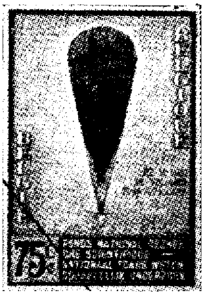


Famous 1913 Liberty Head nickel.

A NICKEL that is worth one thousand times its face value! Sounds incredible, but you may have such a coin in your own pocket. If it looks like the picture reproduced herewith, your lowly nickel is worth $50. The coin is the famous Liberty Head nickel of 1913. Its value derives from its rarity. The mint has no record of its manufacture.

Science and the Postage Stamp

SCIENTIFIC achievement, as well as the victories of warriors and statesmen, are now acknowledged by the postage stamp, which is becoming more and more a mirror of contemporary achievement. A most interesting example is the Belgian stamp shown at the right, commemmorating the ascent of Professor Piccard into the stratosphere. The stamps show Prof. Piccard's balloon (a description of which was published in MODERN MECHANIX AND INVENTIONS at the time) and carry the dates of his two ascents—May 27, 1931, and Aug. 18, 1932.



Imitation Tree Stump Is Ornamental Trash Receptacl

Built of concrete, toughened to simulate bark, this imitation tree stump does duty as an ornamental trash holder.

TRASH cans in general are not expected to be beautiful although they are often from necessity located in beautiful places. The public parks in Washington, D. C., are making use of a combined trash container and incinerator which is both serviceable and does not mar the landscape. They resemble an old hollow stump and are built of concrete.

The surface is roughened and colored properly so that at a short distance it is hard to tell them from the real article. The cover over the top resembles a saw cut and a suitable opening is provided for the entrance of trash. Bars are provided to keep trash off the bottom and two openings make a good draft so that trash is easy to burn when it becomes filled.

Man's Head Is Natural Radio Set

A MAN with a "radio brain" has recently been exhibiting his freak capacities in Europe. The seemingly uncanny power possessed by this man permits him to receive radio programs directly without the aid of a receiver or other apparatus. He merely listens and hears the program inside his brain. Since the actions of the human brain are known to be electric, if is possible that this man's brain might in some mysterious way be a natural radio set.

Safety Holder for Fag Smokers

Cigarette end burns safely in a wire cage, which holds ashes.

FOR men whose wives complain about ashes on the rug, the invention of a Cincinnati. Ohio, man will prove a great boon. This new "safety smoker," as the gadget is called, consists of a small box like affair of light metal, with top and sides covered by a light screen. The fag is inserted and held as shown.

Bed Bugs Show We Lived in Caves

EVIDENCE for the theory that human beings once were cavemen living in holes or shelters in the rocks, rather than forest dwellers living among the trees, has been discovered by two British experts on insects. Insects of the bed bug group infest bats, pigeons and house martins, all of which originally were cave creatures. This suggests that an original association in ancient caves between these birds, bats, bed bugs and man has persisted in man's modern cave substitute; the house.

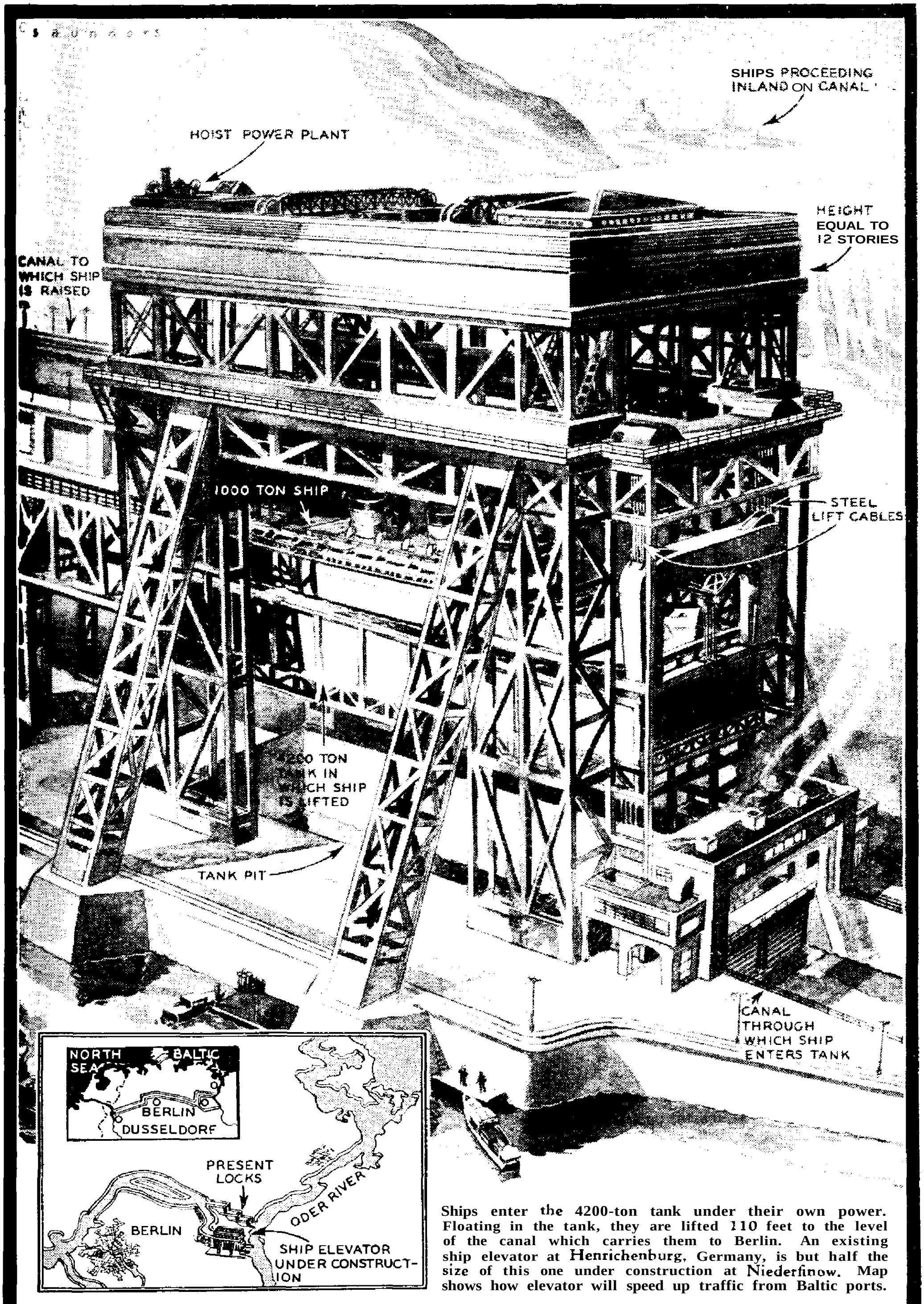
Coin Operated Phone for Home

TO PREVENT excessive phone bills and to lessen the "Can I use your phone" nuisance, a coin-operated lock can now be obtained for either the French cradle type phone or the standard type. In operation, a nickel is inserted in the slot after removing the receiver from the hook and the plunger is pushed down with the finger.

The device can be applied in a few seconds to all types of standard phones. It is used in offices, stores and homes where the meter system is employed.

Placing coin in slot and pressing the plunger brings phone into action, and reduces excessive phone bills incurred by friends who use the instrument while you pay the bill.

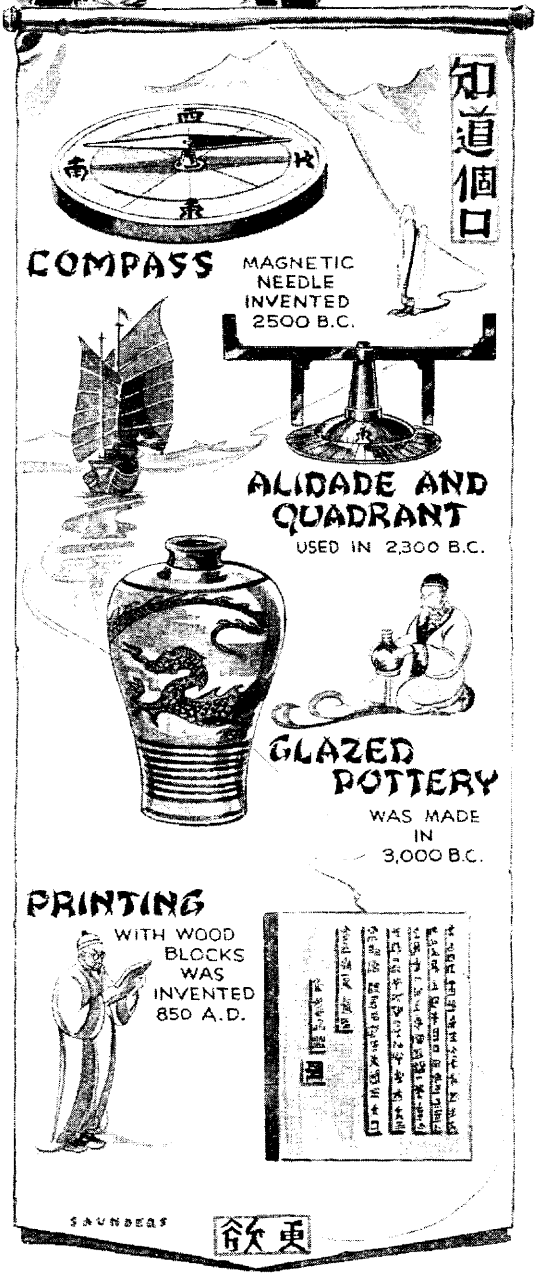
Ships Lifted BODILY in ELEVATOR


SHIPS PROCEEDING INLAND ON CANAL
HOIST POWER PLANT
HEIGHT EQUAL TO 12 STORIES
CANAL TO WHICH SHIP IS RAISED
1000 TON SHIP
STEEL LIFT CABLES
4200 TON TANK IN WHICH SHIP IS LIFTED
TANK PIT
CANAL THROUGH WHICH SHIP ENTERS TANK
NORTH SEA
BALTIC
BERLIN
DUSSELDORF
PRESENT LOCKS
ODER RIVER
BERLIN
SHIP ELEVATOR UNDER CONSTRUCTION

Ships enter the 4200-ton tank under their own power. Floating in the tank, they are lifted 110 feet to the level of the canal which carries them to Berlin. An existing ship elevator at Henrichenburg, Germany, is but half the size of this one under construction at Niederfinow. Map shows how elevator will speed up traffic from Baltic ports.

To relieve congestion on canal between Oder river and Berlin, huge ship elevator shown above is being constructed.

JOHN CHINAMAN



These pictures tell their own story. All of these devices, so important to our present civilization, were discovered by the Chinese thousands of years ago.

WHERE there ain't no ten commandment and a man can raise a thirst, there's a ancient science extant that looks like th very first. We think we're the only ones who know smelting and hydraulics and ceramics and printing and electricity. But old John Chinaman had a civilized working knowledge of them all so long ago that our ancestors appear to have been dumbells at the time. They were living in total ignorance of a civilization so advanced and so fundamental that even to this day John Chinaman is ahead of us in the application of many things mechanical he has known since Noah built the ark.

Here's the parade of a few, taken in order:

Why Holes in Chinese Rudders?

Chinese junks have holes in their rudders to make them steer better. Just a hundred years ago we learned that water pressure in front of a hole through which water was flowing was greater than would be pressure on an equivalent non-open area. Chinese rudders, full of holes for thousands of years, are more effective per foot of area than ours. In the air this phenomenon of fluid flow has only recently been taken advantage of through the use of the slotted wing for aircraft.

Lee boards and centerboards are distinctly Chinese in origin. This fact is checked against history—as a matter of fact all the asseverations here are a result of research and have been checked against any possible tendency to ascribe the origin of any or everything to Old Johnnie Chinaman.

The waterwheel, or Noria, was used in 1500 B. C. for raising water from one level to another, and as far as can be determined was the earliest form of machine to make water lift itself.

The Discovery of the Piston

The piston was a Chinese method for blowing air. James Wall made use of it in the first steam engine, reversing, as he put it at the time, "the function of the Chinese air pump."

The Chinese determined equinoxes and solstices as early as 2300 B. C.; they recorded the first eclipse in 2130 B. C. and modern astronomers with their mathematics and years of observation have been able to show that an eclipse really did occur then. History has thus been able to check itself through the rhythmic movements of the sun and moon.

Printing from clay blocks and wooden tablets was used as early as 50 B. C. This antedates the European invention of Guten-

HIS SCIENCE

berg in 1463 A. D. by quite some little span of time.

The Chinese use of instruments resembling armillary spheres and quadrants proves that they antedated the alidade of Tycho Brahe by at least three centuries, knew navigational elementals before we did.

No Iron Age in China

Bronze was used about the 5th Century B. C. Funny that the Chinese never passed through an iron age—that phase of world history is really Occidental. But they knew smelting and the primitive reduction of copper bearing ores. Their beautiful chinaware and ceramic work, clay firing, etc., as expressed in cloisonne work where a vase or dish is put through hundreds of strings for decorative colorings, is well known. The art is reported by Marco Polo after his first trip to the Orient.

Use of the loom was known in 1200 B. C. and the same form is used in many Chinese provinces today.

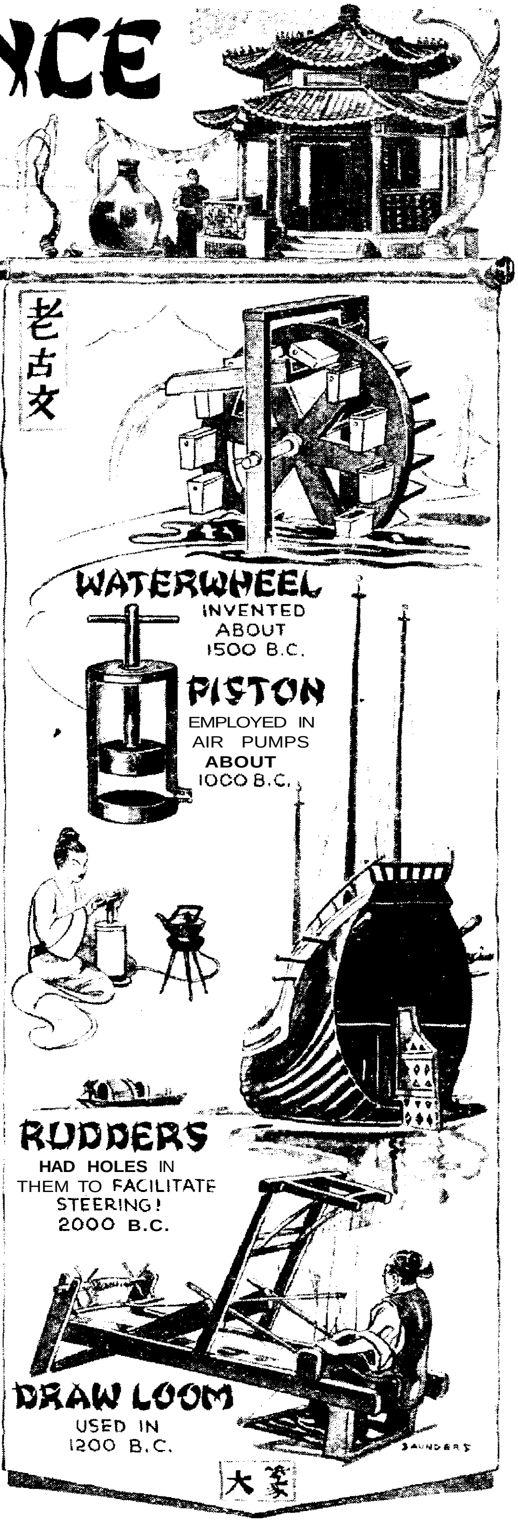
The compass as applied to the navigation of ships really had its origin in the Chinese magnetic bar which was used on wagon trains to give the drivers some sense of general direction in their journeys.

Travels of the Compass

The Arabs adapted it to desert traveling and it was taken thence to the shores of the Mediterranean. Phoenicians used it in a rough form. Later we find Columbus using a sensitized needle floating in a bowl to show him "whether his ship was standing on her ear or no."

The Chinese have been foremost among the early cultural races in their advancement of things pertaining to shipping and to the sea. Marco Polo thought the junks of the Chinese very quaint at first sight, but was amazed at the efficiency of a sail held in place by battens. It was so superior to the loosefooted square sail the Romans had handed down in turn from the Vikings, that the real beginning of the fore-and-aft rig began when Polo returned with battened sails to Europe.

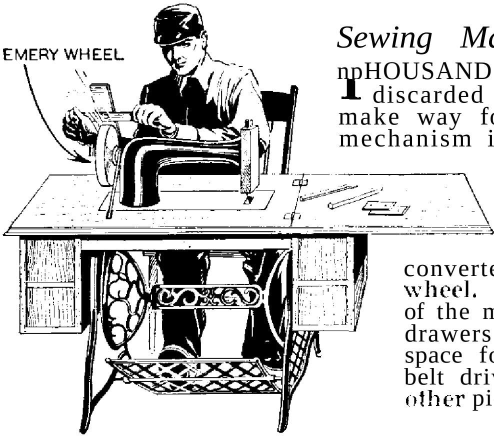
It is rather fascinating to conjecture on some of these things, to realize that plodding John Chinaman, who seems thick and slow and dense to modern Western culture, should have sought out these truths of nature, these mechanics that we today are using in the iron men of our machine age. And to realize that we haven't yet extracted all of the value from their applications as in some instances John Chinaman has done with his science.



Out present mechanical age would have been impossible without the fundamental inventions made by John Chinaman before the Christian era.

HANDIKINKS

Do you know **any short-cuts or handikinks which readers of these pages** would **find valuable? Send your ideas in to the magazine; if they are new and novel** you'll **receive a check in payment at regular rates.**



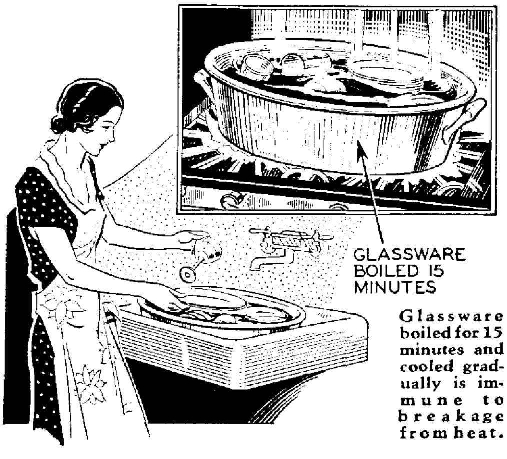
Sewing Machine Replacement Makes Grinde

THOUSANDS of foot-powered sewing machines have bee discarded or put away in some corner of the attic t make way for up-to-date electrically driven units. Th mechanism is usually in good working order and with a few changes can be made a valuable addition to the workshop equipment. Remov the flywheel of the sewing machine and replace it with an emery wheel; this gives you an excellent grinder which can also be converted into a polisher by substitution of a bulling wheel. With some additional labor, the needle head of the machine can be converted into a jig-saw. The drawers of the sewing machine make useful storage space for files, reamers, and other small tools. Th belt drive of the machine can also be used to drive other pieces of equipment.—Chester Sullivan.

Making Glassware Heatproof

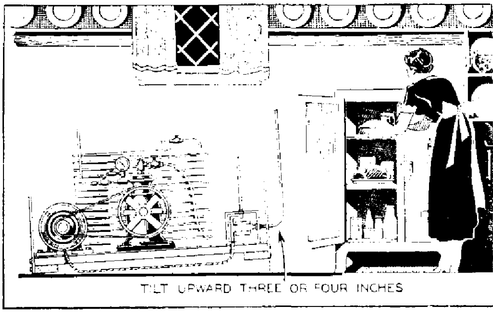
ORDINARY glassware, when subjected to sudden extremes of hot and cold temperatures, reacts by cracking to pieces. This is because different sections of the glass expand with varying degrees of rapidity when hot water, for instance, is poured upon it. A special kind of glass known as Pyrex is sold which is immune to heat breakage, but the simple method shown below will accomplish much the same effect.

Fill a large pan with cold water and put into it the glassware you wish to immunize against breakage. Place the pan with the glassware on the gas range and bring the water to a boil. Let it boil for fifteen minutes. Turn off the heat and let the glassware cool gradually. This is in effect a process of annealing.—Vogel Albinson.



Glassware boiled for 15 minutes and cooled gradually is immune to breakage from heat.

Electric Refrigerator Repair

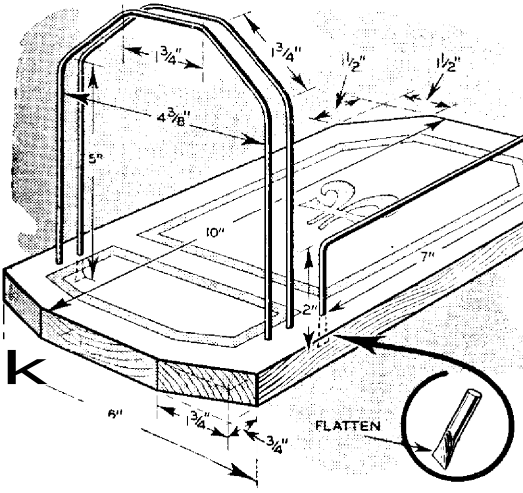

TILT UPWARD THREE OR FOUR INCHES

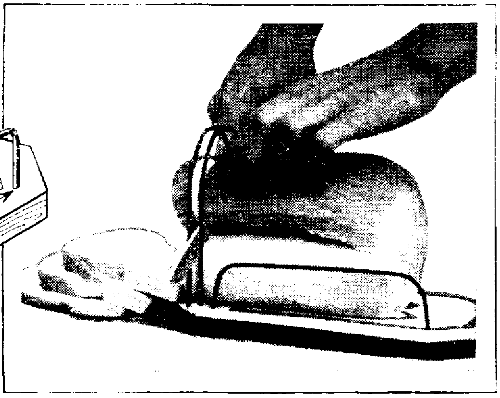
WHEN the electric refrigerator refuses t operate, the trouble may be due to shortage of gas in the liquid line. Thi usually happens when the suction lin frosts. If service is unavailable for severa hours, you need not be without the service of your refrigerator. Simply tilt the refrigerator three or four inches from the floo on the end of the compressor opposite th liquid line. If you are not sure which is th liquid line, tilt in both directions until you get results. If the machine is short of ga it will operate for several days when tilte

Safety Guard for Flour Bin

HINGED flour bins which fall back o their own weight when the pull is re leased are serious threats to the housewife fingers. A simple guard can be made from a strip of wood with a weight on one end mounted on a nail, off-center, so that when the bin is opened the weight drops, the end of the wood rises and catches on the lip o the bin holder.

Two Kinks for the Kitchen





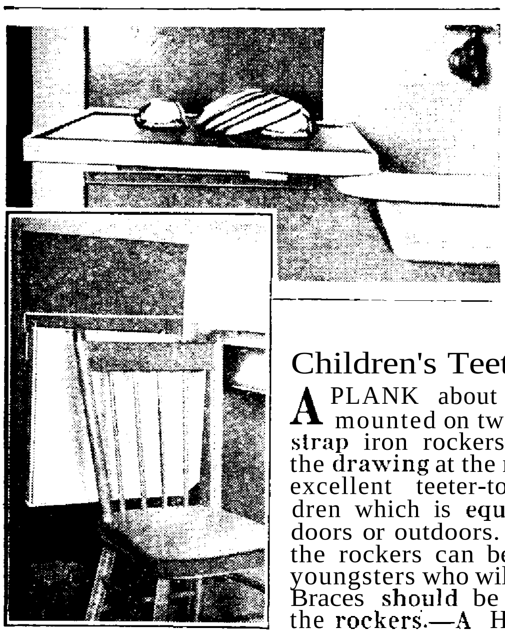
A pine board and *a* few lengths of stiff wire, shaped and mounted as shown here, make an excellent bread slicer which simplifies the task of cutting bread into uniform, square slices

CUTTING uniform slices of bread is something of a task, particularly if the bread be fresh and soft and the cutting knife not any sharper than the law allows. And even under ideal conditions it takes some skill to cut slices square instead of wedge-shaped.

The bread slicer shown above solves the problem handily. Shape a pine board to the dimensions shown and bend the wire to the form indicated. No. 9 galvanized wire is about right, but the kind of wire is not critical as long as it is stiff enough to stand firmly when the flattened ends are driven into the wooden base. The pair of wire uprights forms a guard between which the knife slides. The loaf is firmly supported at the same time, aided by the long wire side bracket which keeps it square on the board.

A shallow groove cut between the knife guards will assure a cleaner slice. The bread slicer can be painted or stained, but a coat of shellac or varnish is recommended to leave a smooth, impervious surface which can be kept clean.—Tige Harrison.

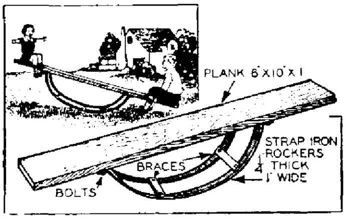
Collapsible Drainboatd for Kitchen Folds Out of Way When Not in Use



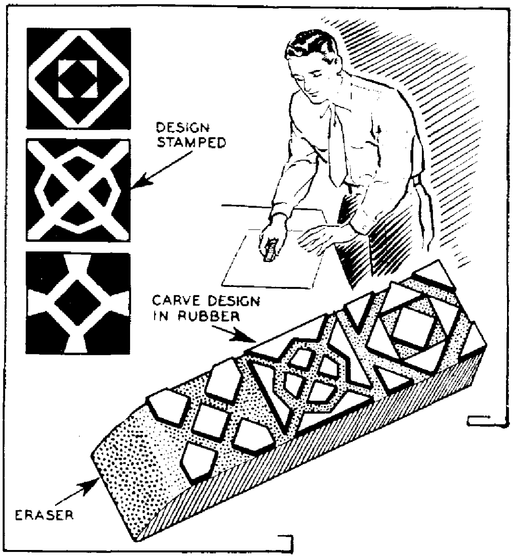
A DRAINBOARD is a necessity for washing dishes, but in the small kitchen it can make considerable of a nuisance of itself by taking up valuable space. The photos at the left show a figurative method of eating your cake and having it too. The drainboard shown is mounted on a rod which slides through two screweyes. When in use, the board is slid over until one end rests on the edge of the sink. After use, it is pushed back and drops down to hang parallel with the wall, occupying practically no space. A hook dropped through a screweye prevents the board being knocked aside when loaded with dishes

Children's Teeter-Totter for Outdoor or Indoor Use

A PLANK about six feet long, mounted on two semi-circular strap iron rockers, as shown in the drawing at the right, makes an excellent teeter-totter for children which is equally useful indoors or outdoors. The height of the rockers can be suited to the youngsters who will use the teeter. Braces should be used between the rockers.—A H. Waychoff



Helpful Ideas for Home Use



Rubber Stamp From School Eraser

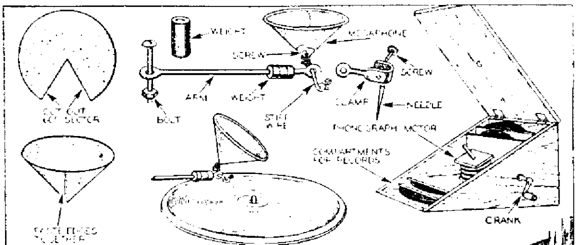
AN ORDINARY school eraser and a sharp knife or safety razor blade are all that are required to make a rubber stamp that will imprint monograms, initials, decorative patterns, and the like.

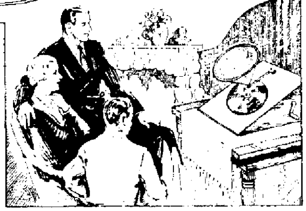
Draw the desired design on the eraser with a pencil, bearing in mind that the units must be reversed, as if you were looking into a mirror, so that lettering, etc., will not read backward. Cut away surplus rubber to a depth of about 1/32 inch, remembering that the raised sections will print black and the parts you cut away will show white on the finished print.

Borders and various repeat patterns can be carried out in a manner similar to block printing. Straight lines are, of course, easier to cut than curves. Designs can be stamped on fabric which is later to be embroidered. In the absence of an ink pad, a blotter moistened with ink may be used, but avoid blots caused by excessive inking. Colored inks often may be used with effect.

A Loudspeaker Phonograph

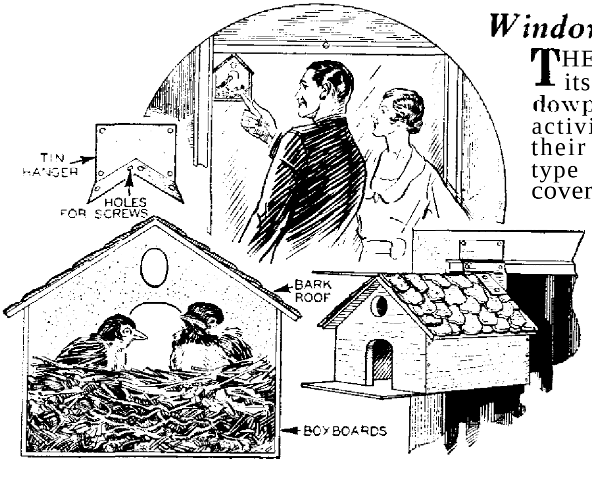
HERE'S a simple little phonograph which the amateur can assemble, giving a truer reproduction of music than the conventional phonograph because of its utilization of the radio loudspeaker principle. First build the wedge-shaped box shown, approximately 13 inches square and 6 inches high at the rear. The only thing you cannot make yourself is the clockwork which drives the records. This may be purchased or reclaimed from a junked phonograph. The sound funnel is made of celluloid or stiff drawing paper. Lay out a circle about *1* inches in diameter and cut out a GO degree segment, rolling into funnel shape. Then the lever, some 6 inches long, is mounted. This is simply a length of light metal rod, weighted at the end with rings to adjust its pressure on the record. The needle attachment is shown clearly in the drawing. The needle should slant downward and slightly toward the center of the record for best reproduction.—Hans Kutschbach.





Windowpane House Shows Bird Life

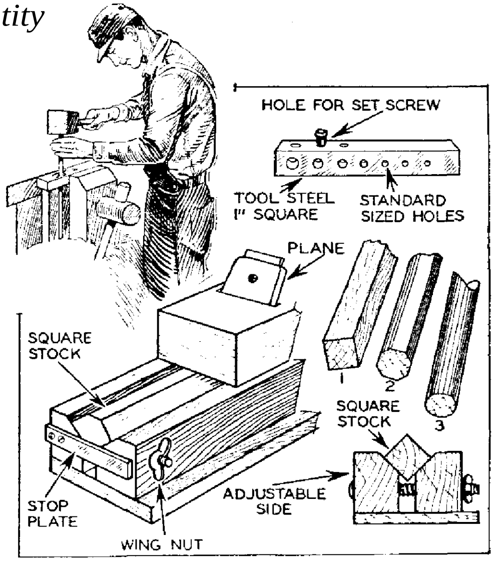
THE windowpane bird house is built with its back open, butted up against the windowpane so that you can look on at the activities of the songsters in feathering their nest. The drawing shows the best type of house, built from boxboard and covered with a bark roof. A tin hanger of the shape shown will hold the house suspended against the window. If your birds show fright at their transparent back door, pin up a piece of cardboard on the pane until they grow tame. For bluebird, chickadee, swallow or wren, the entrance to the house should be from 1¼ to 1½ inches wide, and the size of the cavity about 6x5 inches, except for the chickadee, which should be 10x4.—Julia Wolfe.

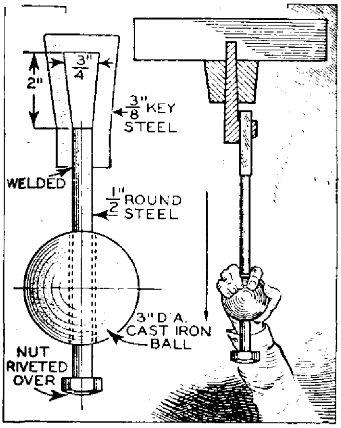


Stunts for the Workshop

How to Make Wood Dowels in Quantity

BOTH hardwood and softwood dowels are used so much that this simple device will find universal use for making them quickly, simply and cheaply. Get a 1-in. square piece of tool steel, have a. series of standard-sized holes drilled along it, then have small holes drilled and tapped into the sides of a few of these (for small set screws), and have this bar hardened and tempered. To use, the stock is driven through the holes with a wooden mallet. Square stock is chosen, then the corners planed off to make an octagon, and one end sharpened or pointed so as to enter the hole. By driving it clear through, a long dowel is made of the required size. The set screw makes a groove in the dowel when this is needed to let air and glue escape, and is used only when such a groove is needed. For planing the square stock the bench fixture shown is very helpful to hold the stock tight while the corners are planed off. It consists simply of a V-groove adjustable to depth by a wing-nut device.—Morris A. Hall.



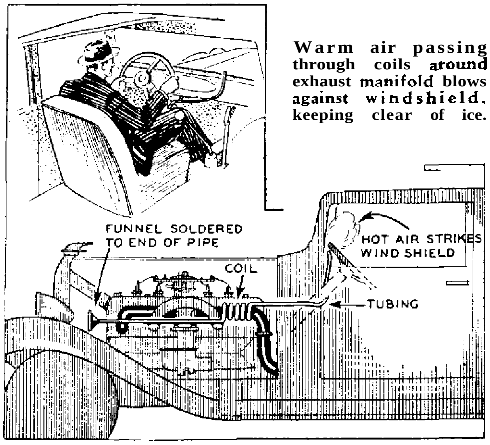


Puller for Gib-keys ***Works Like*** *Hammer*

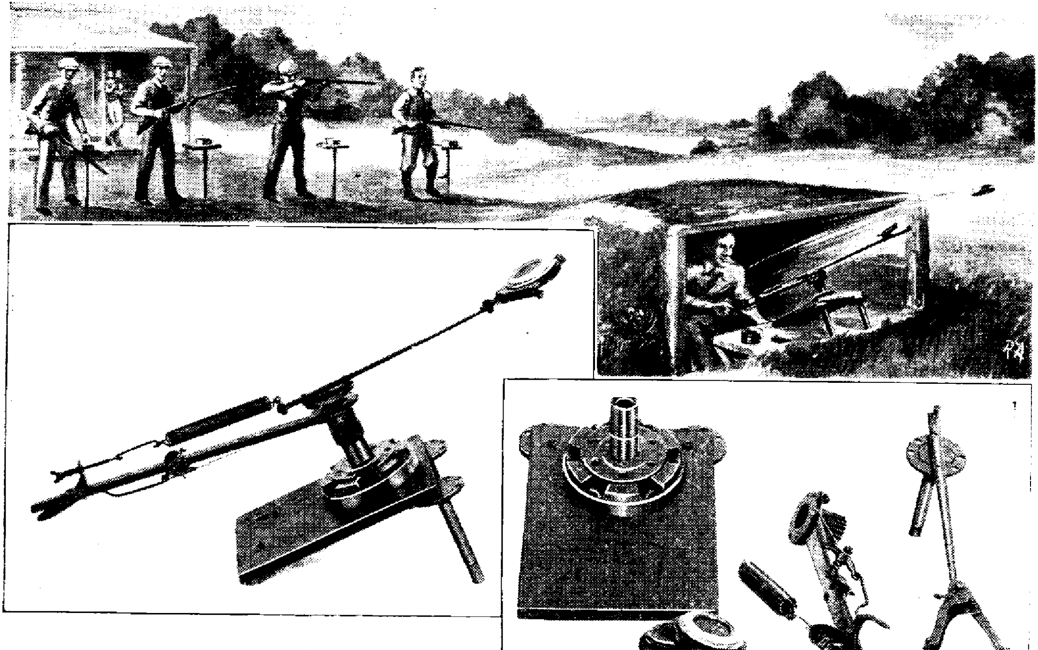
IN WORKING with machinery it is frequently necessary to pull gib keys, and when these have been driven home with a heavy hammer the job is no easy one. A home made puller built to the dimensions shown at the left pulls % inch keys with comparative ease. The metal loop which fits over the key head is shaped and welded to one end of a metal rod. A round ball or sliding weight which affords a good hand hold is slipped on to the rod and a nut welded on the lower end. Fit the loop over the key; then, striking smartly against the nut with the sliding weight, a hammer action is produced which soon loosens the most stubborn key. It is highly important that the nut be well secured to the end of the rod, in order to survive the strain of constant hammering. Welding is, of course, the ideal method of securing the nut, but it can be screwed tightly on to the rod and the projecting end hammered down like a rivet head.—William Speaker.

Tubing Keeps Mist Off Windshield

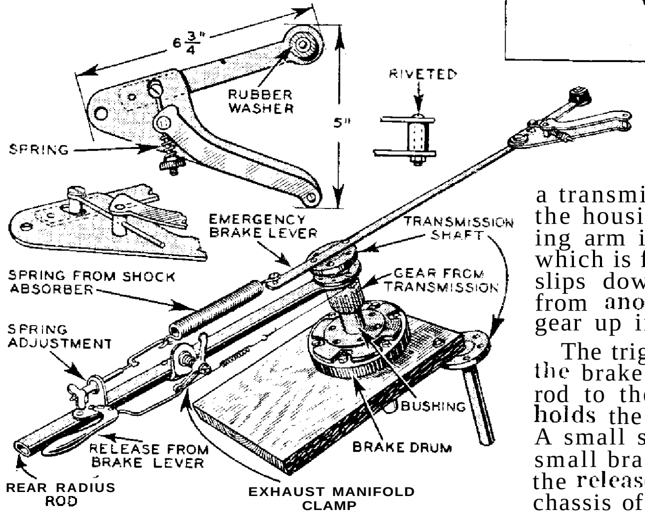
THROUGHOUT the winter months motorists are bothered by the formation of mist and ice on the windshield, obscuring vision. Here is a cheap, home-made attachment for doing away with this menace to safety which functions efficiently. A generous length of quarter inch copper tubing is coiled around the exhaust manifold six or eight times at a convenient spot. Its forward end is directly behind the radiator fan, and a small funnel mouth is soldered there. The other end is carried through the floorboards, bracketed to the steering post, and bent to direct its stream of warm air against the windshield, keeping it clear of mist. The air flow should be directed upward against the glass. The more coils that are wound around the manifold, the warmer will be the air that strikes the windshield.


Warm air passing through coils around exhaust manifold blows against windshield, keeping clear of ice.

Target Trap from Model T Parts



The two photographs show the target trap in sections, and completely assembled, while the drawing illustrates the device in action. It *is* constructed in its entirety from old parts of Ford Model T.


6 3/4"
RUBBER WASHER
5"
RIVETED
SPRING
EMERGENCY BRAKE LEVER
TRANSMISSION SHAFT
SPRING FROM SHOCK ABSORBER
GEAR FROM TRANSMISSION
SPRING ADJUSTMENT
BUSHING
RELEASE FROM BRAKE LEVER
BRAKE DRUM
REAR RADIUS ROD
EXHAUST MANIFOLD CLAMP

Various Model T parts can be identified in this drawing of target trap. It will throw up or down or to either side.

THIS target trap is made entirely from old Model T Ford parts. These may be obtained from any junk yard for almost nothing. The main support is made from a brake drum from the transmission. This is fastened to the wood base. Two transmission shafts are used as elevators under the front end of the base. These are fastened with one bolt each so that the angle the target is thrown can be easily regulated.

The arm which throws the target is made from the brake lever, which is fastened to a transmission shaft which slides down in the housing on the brake drum. The guiding arm is made from the rear radius rod which is fastened to the reverse gear which slips down over the housing. A bushing from another old reverse gear holds this gear up in place.

The trigger is made from the release from the brake lever. It is connected by a small rod to the exhaust manifold clamp which holds the arm until the release is pressed. A small spring holds the gun cocked. The small brackets holding the main spring and the release are body braces taken from the chassis of an old model T. The mainspring was taken from a shock absorber made for Fords. Any suitable spring could be used.

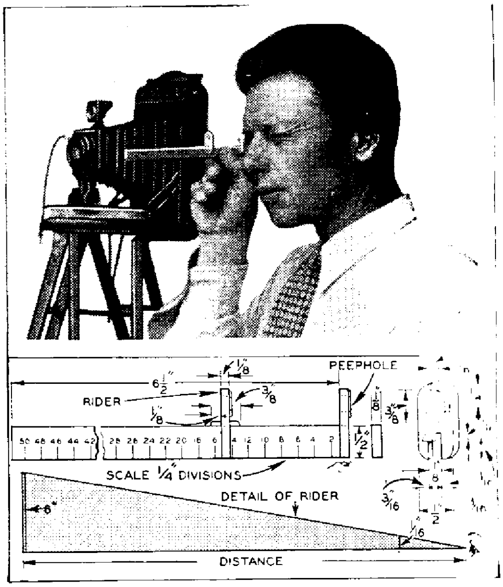
The distance the target will be thrown can be regulated by adjusting the winged nut on the spring holder. The throwing hand is most important. This may be purchased, but the one shown was cut from a transmission cover with a hacksaw. The drawing shows the right shape. The adjusting nut regulates the point at which the hand throws the target. After it is finished it should be adjusted so that the target leaves in a direct line with the guiding arm. This trap will throw up or down, or either side by just moving the guiding arm.

Kinks for Picture Makers

A Range Finder for a Kodak

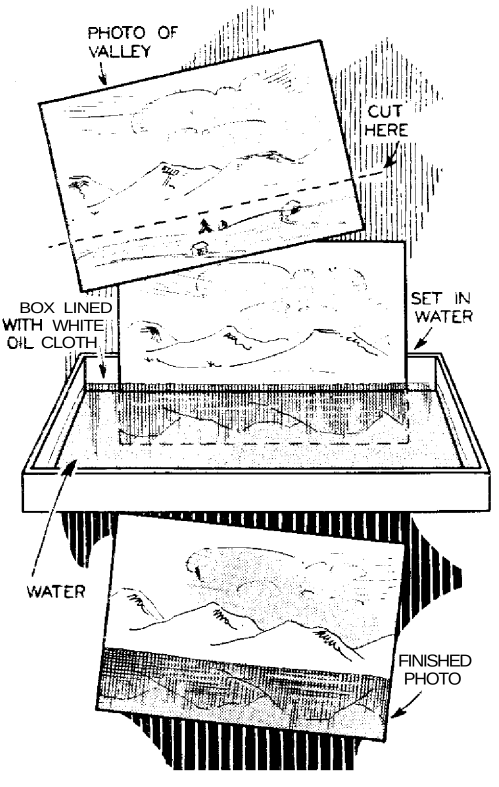
A RANGE finder that takes all the guess work out of estimating distance can be made from scraps in a short time. The base is a hardwood strip, ⅛ by ½ by 6½ in., scaled with ¼ in. divisions. Two other parts, an eye piece and a rider, are also of ⅜ by ½ in. hardwood, pierced with ¼ in. holes and slotted to fit over the scale, The eye piece is glued solidly at the zero end of the base. Over the hole is cemented a celluloid window cut from an old negative, which is pierced in the center with a 1/32 in. (or smaller) hole.

The rider has a window with a ⅛ in, hole, and is slotted 1/16 in. deeper than the eye piece, providing for a horizontal block which, resting on top of the scale, holds the rider upright. A 6 in. strip of wood, painted black on one side, is provided to sight on. When using the range finder, rest the strip against the subject and sight it through both holes, the eye piece being even with the camera lens. Slide the rider until the strip spans half the hole, and read the result in feet on the scale.—Edwin M Love.



Using the range finder to gauge distance for focusing.

Picture of Flooded Valley Faked With Print Reflection in Pan of Water



To show how a valley would appear after flooding a print of the area was placed in water as shown and the reflection photographed.

A NEWS photographer was recently called on to show an actual photograph of a huge valley, now existing, as it would appear after engineers had changed it into a reservoir containing water to a depth of over 400 feet. This at first seemed an impossible photographic feat, but was cleverly solved in the following manner.

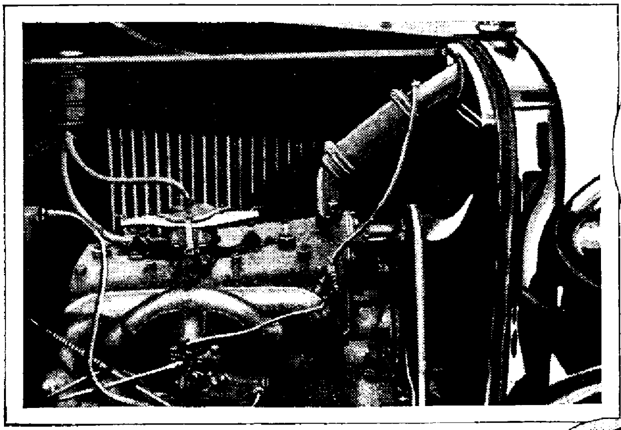
A large view was photographed of the beautiful valley, showing the existing farms, streams, etc., just as they exist. A print was made of double weight paper which was then prepared on both sides with a coating of white varnish to protect it from moisture. The print was then tacked flat on a thin board.

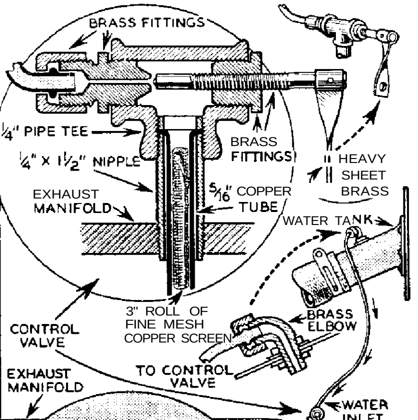
Next a water container was lined with white oilcloth and the print immersed in water vertically, until a level was reached on the picture showing the water level as. it would appear when the valley was flooded. With proper lighting from each side to overcome shadows, the picture was photographed on a second negative. This was then blocked out around the edges to cut put all views of the water pan. The resulting print showed just the range of hills projecting from what appeared a lake surface with the reflection of the distant woods and shoreline in the far side of the lake

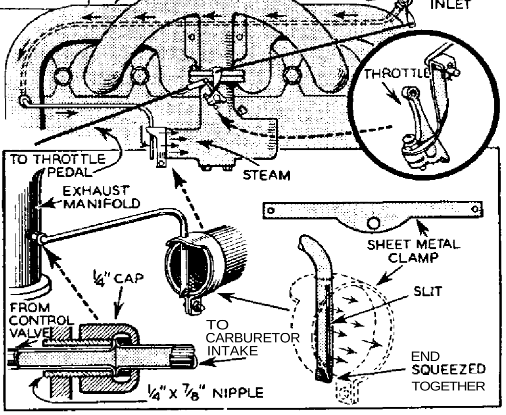
Speeding Up Film Washing

A rectangular wooden frame, between whose ends one or two rolls of film can be suspended and floated on the surface of water which fills the bathtub to the overflow drain, makes an excellent washing device for film which requires practically no attention.

A Moist Air Feed for the Car




BRASS FITTINGS
¼" PIPE TEE
¼" x 1½" NIPPLE
BRASS FITTINGS
HEAVY SHEET BRASS
EXHAUST MANIFOLD
5/16" COPPER TUBE
WATER TANK
3" ROLL OF FINE MESH COPPER SCREEN
BRASS ELBOW
CONTROL VALVE
EXHAUST MANIFOLD
TO CONTROL VALVE
WATER INLET


THROTTLE
TO THROTTLE PEDAL
STEAM
EXHAUST MANIFOLD
SHEET METAL CLAMP
SLIT
¼" CAP
FROM CONTROL VALVE
TO CARBURETOR INTAKE
END SQUEEZED TOGETHER
¼" x ⅞" NIPPLE

Moist air feed installed in Model A Ford. Note water intake from radiator hose. Water is turned to steam by exhaust heat.

Parts of moist air feed are shown in drawings. Note that control valve is completely closed when throttle is retarded.

MOIST air has long been known to aid in smooth operation of gasoline engines. Obviously it is impossible to have rainstorms made to order, but with the device illustrated here you can, in effect, create ideal shower conditions inside your motor. This moist air feed utilizes the exhaust heat to turn the water into steam before feeding it into the motor. The control is entirely automatic, the valve opening only when the throttle is opened, feeding water in proportion to the speed driven.

Although the original outfit was placed on a Model A Ford, it can be adapted with slight alterations to any make of car.

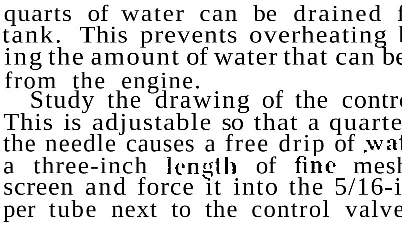
The photograph shows the general installation. Water is taken from the upper tank of the radiator through the connection shown in detail in the drawing. It should be placed high enough above the upper radiator hose so that no more than two quarts of water can be drained from the tank. This prevents overheating by limiting the amount of water that can be "stolen" from the engine.

Study the drawing of the control valve. This is adjustable so that a quarter turn of the needle causes a free drip of water. Roll a three-inch length of fine mesh copper screen and force it into the 5/16-inch copper tube next to the control valve to give an even flow of water to the tube in the exhaust chamber.

The copper tube from the exhaust to the carburetor intake is fastened by means of a sheet metal clamp. The inside of the tube over the intake is slit with a hacksaw the entire distance of the intake opening, and the bottom of the tube squeezed shut.

Method of fastening control arm to throttle arm is shown in the drawings. The heavy wire connecting rod is made just the right length to keep the water valve closed when the throttle is entirely retarded

Sign on Front Bumper Combines Warning With Advertising Message

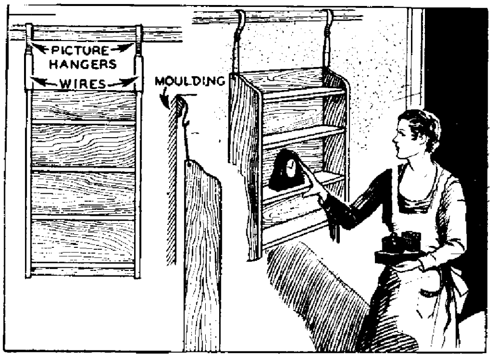

CAREFUL! STAR LAUNDRY
MOVE!-ACME TRANSFER

THE front bumper of a delivery truck offers ingenious advertising opportunities which are rarely made use of. Lettering can be placed on it ostensibly playing up the safety first angle, tied up with the company's name so unobtrusively that the observer scarcely realizes he is reading advertising. Innumerable suggestions pertinent to particular businesses will occur. "Careful! Star Laundry" not only carries a warning message, but implies that the laundry itself is careful. Other suggestions might include: "Watch Your Step! Jones Shoe Co."; "Watch Out! Gem Jewelers"; "Look Smart! Brown Clothing Store," etc.—V. E. Barnes.

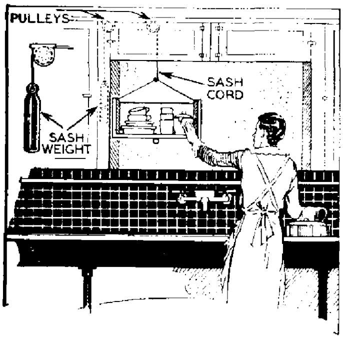
Aids for the Busy Housewife

Shelving May Be Hung From Picture Moulding Without Marring Walls

OCCASIONALLY there is a need for temporary shelving in some room, as when an unusual number of diners are being served and a piace is needed to store dishes. The expedient of hanging temporary shelves as shown at the right is helpful. Ordinary picture hangers support strong wires which hold up the shelving. With this method it is entirely unnecessary to mar the wall plaster or scar the moulding, and when the shelves are removed there is no evidence that they have ever been there. If wires of a tone to match the plaster or wall paper are chosen, they will be practically invisible at a slight distance and the shelves will appear built into the wall. — V. E. Barnes.



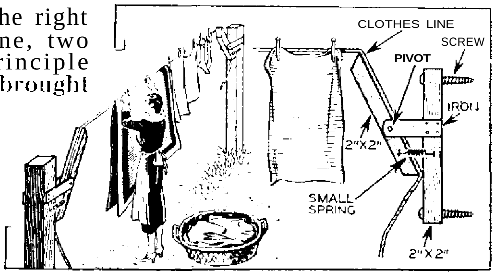
"Elevator Shelf" Makes Inaccessible High Cupboard More Convenient



THERE are two cupboards in every modern home that are almost useless, except for dead storage, because of their inaccessibility. They are the two located above the kitchen sink, as shown in the drawing at the left, or above the built-in kitchen cabinet. They are so far out of reach that the average housewife climbs a ladder, puts something away, and then forgets it for a year or two. A solid shelf, boxed on three sides, to fit into the cupboard. can be fitted with a sash weight sliding over pulleys as shown. When wanted, the shelf is simply pulled down by means of a hook engaged in a screweye in the bottom. Of course, the permanent lower shelf of the cupboard must be removed so that the elevator unit can be slipped into place out of sight. A sufficiently heavy sash weight should be used. — H. C. Thomas.

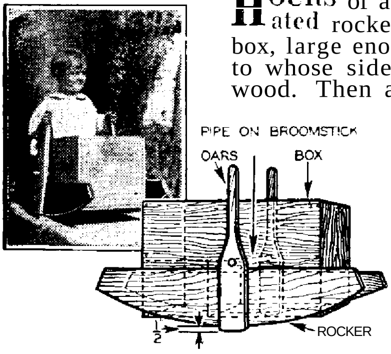
Self-tightening Clothes Line Holder Is Operated by Weight of Clothes

THE simple clothesline tightener shown at the right is made from two pieces of 1x2 white pine, two pieces of strap iron, and a small spring. The principle involved is obvious at a glance, leverage being brought into play by the weight of the line to grip the loose end firmly. The more clothes hung on the line, the tighter the rope is gripped. The spring is used merely to keep the two wooden pieces gripping the rope when there is no tension on the line, and it need not be strong for this purpose. The completed unit is screwed to the upright post.—C. H. Williams.



Amusing Rocker Toy for Children Made From Box and Scraps of Wood

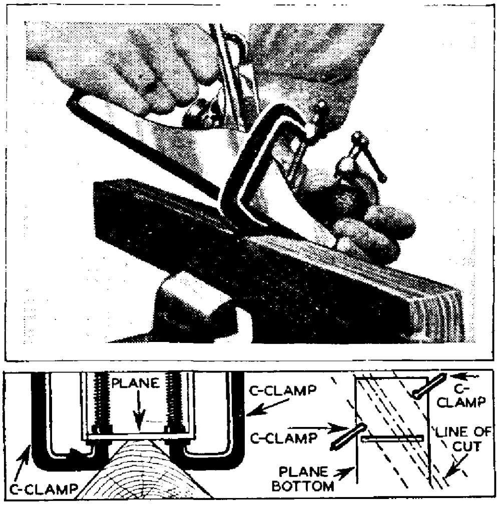
HOURS of amusement will be afforded children by the hand-operated rocker shown at the left. It is constructed from a wooden box, large enough to accommodate a youthful occupant comfortably, to whose sides are nailed wooden rockers cut from pieces of hardwood. Then add the paddle-like handles, which swing on a broomstick or pipe axle. A crude but entertaining form of locomotion results from rocking and manipulating the handles.—D. H. Butler.



To Adjust the Gas Range Flame

IF THE pilot light on your gas range gives continual trouble, cut a hole about three-quarters of an inch across in the top of the cap which covers the pilot. Gas burners should burn with a clean greenish-blue flame. If they burn yellow, open the air shutter just back of the gas cock slightly.

C-clamps Make an Adjustable Beveling Guide for Plane



Clamps on plane act as guide for bevel cuts as shown here.

DIFFICULTY is often experienced in beveling a piece of wood when only a certain amount of material must be removed. The bevel is usually either uneven or at the wrong angle. By using a guide that allows the plane to cut only at 45 degrees and allows only the desired amount of material to be removed, such a difficulty may be remedied.

A suitable and efficient guide for such work may be made from a pair of medium sized C-clamps by tightening them on the plane in the method shown in the photograph. By trial place the clamps at such a distance apart that they permit only the required amount of material to be removed. Tighten them on the sides of the plane so that it may be run along the wood at the best cutting angle. The result will be a perfect 45 degree bevel of the exact width desired.

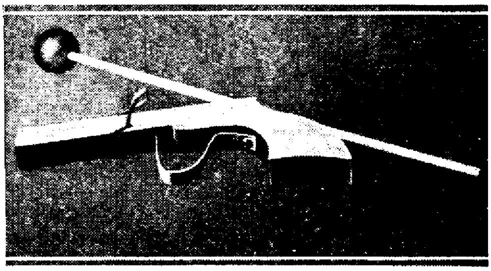
The photo at the left shows how the clamps are applied, while the drawing illustrates the cuts.

Develop Marksmanship and Make Extra Cash With Unique Arrow Gun

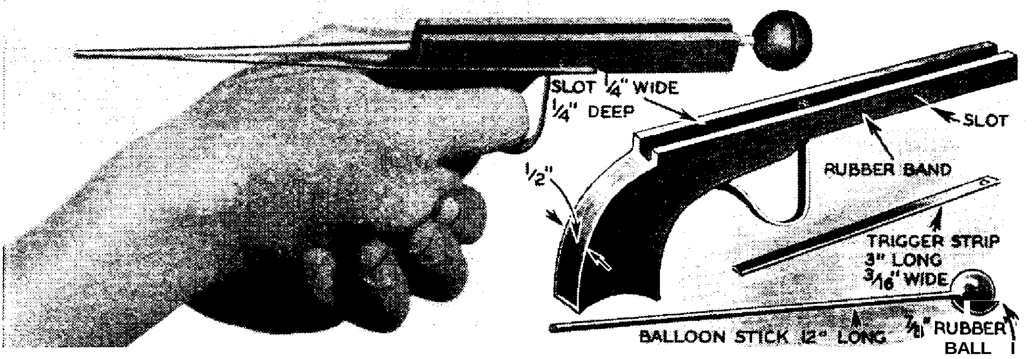
THERE'S a lot of fun to be had in banging around with a little gun like this, and a lot of profit to be gained from making them in wholesale lots to sell in your neighborhood.

The gun is cut from a board 4 in. wide and ½ in. thick, and shaped as illustrated in the drawing below. The next step is to bore a hole for the trigger. This latter part is a narrow strip of rather heavy sheet iron about 3/16 in. wide and of suitable length, with a hole punched in one end slightly larger than the balloon stick which is used for the arrow. The hole must be punched smooth so the arrow will slide through easily.

The strip is then screwed to the handle, and the end with the hole inserted through the slot in the gun and so adjusted that the hole is just slightly above the bottom of the groove. When an arrow is thrust into this, slight pressure on the trigger will pull the free end down and lock the arrow in place. Releasing the trigger will permit the hole to rise slightly, freeing the arrow for a flight into space.

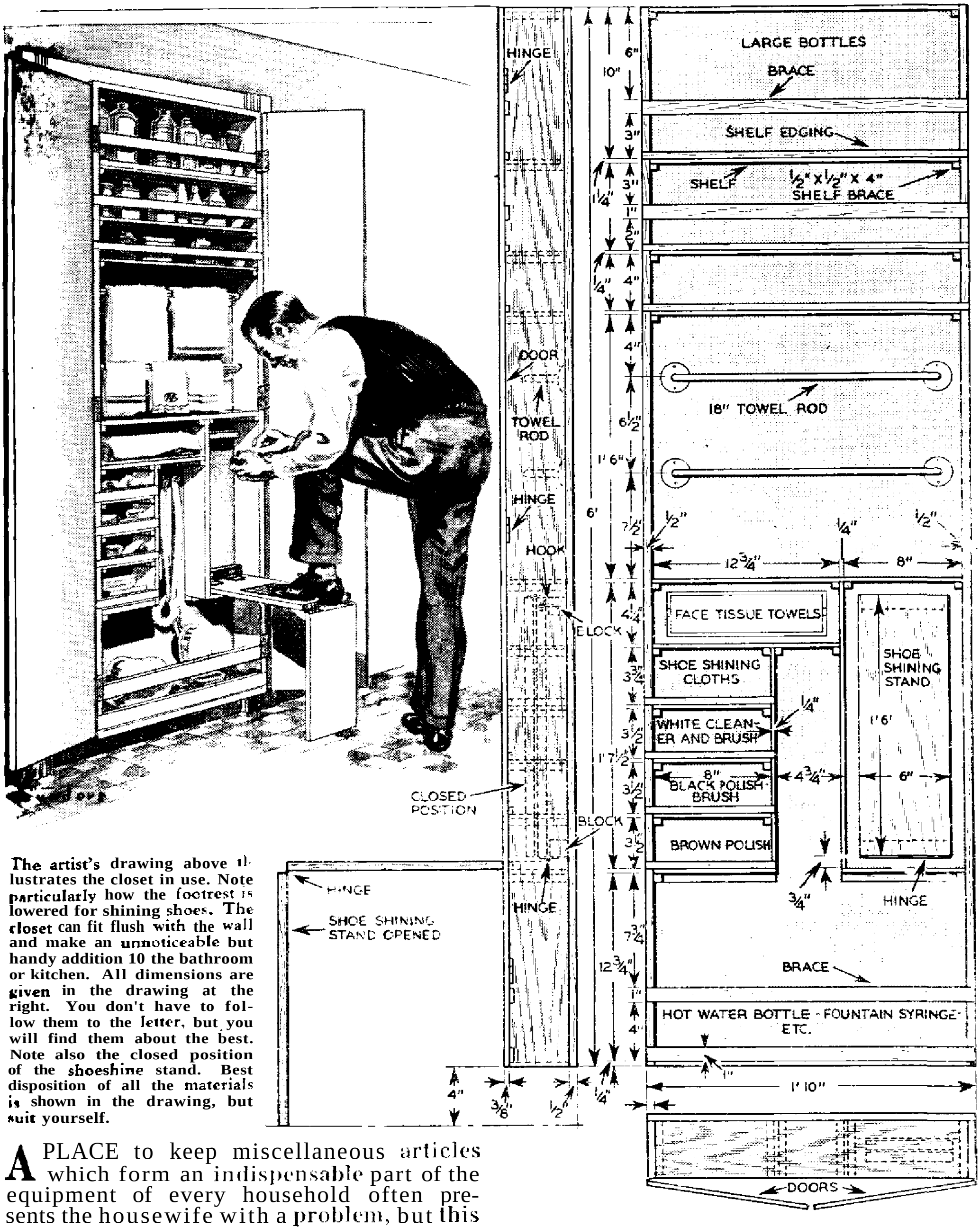


Here's the completed gun and projectile ready to go into action for target firing.



Arrow is here seen in gun ready to be released. All the parts necessary for construction are shown in the drawing.

Build *This Handy Bathroom Door Closet*


HINGE
DOOR
TOWEL ROD
HINGE
HOOK
BLOCK
CLOSED POSITION
BLOCK
HINGE
SHOE SHINING STAND OPENED
6"
10"
3"
3"
1¼"
1"
2"
4"
¼"
4"
6½"
1' 6"
6'
7½"
4¼"
3¾"
3½"
1' 7½"
3½"
3½"
7¾"
12¾"
1"
4"
4"
⅜"
½"
¼"
LARGE BOTTLES
BRACE
SHELF EDGING
SHELF
½" x ½" x 4" SHELF BRACE
18" TOWEL ROD
½"
¼"
½"
12¾"
8"
FACE TISSUE TOWELS
SHOE SHINING CLOTHS
WHITE CLEANER AND BRUSH
8" BLACK POLISH BRUSH
BROWN POLISH
¼"
4¾"
SHOE SHINING STAND
1' 6'
6"
¾"
HINGE
BRACE
HOT WATER BOTTLE - FOUNTAIN SYRINGE - ETC.
1"
1' 10"
DOORS

The artist's drawing above illustrates the closet in use. Note particularly how the footrest is lowered for shining shoes. The closet can fit flush with the wall and make an unnoticeable but handy addition to the bathroom or kitchen. All dimensions are given in the drawing at the right. You don't have to follow them to the letter, but you will find them about the best. Note also the closed position of the shoeshine stand. Best disposition of all the materials is shown in the drawing, but suit yourself.

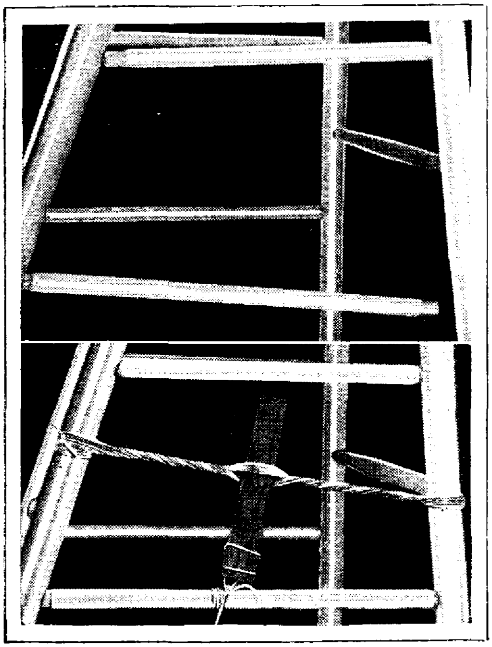
A PLACE to keep miscellaneous articles which form an indispensable part of the equipment of every household often presents the housewife with a problem, but this easily built door closet promptly solves it.

By keeping a supply of guest towels hanging in this closet, they can quickly be exchanged for your own towels when the visitors arrive. It also provides a shelf for large bottles which the average medicine chest will not take. Two more chests of varying heights hold surplus medicine bottles. The amazing capacity of the cabinet is well illustrated in the drawing, which also gives all the dimensions you will need for construction.

A feature of the chest is the shoe shining stand, which consists of two boards, ½ in. by 0 in. by 1 ft. 0 in. long. They are attached to the back of the closet with the aid of two blocks as illustrated. The board used as a footrest is hinged to the bottom block. A few coats of white enamel will do for the paint job.

FIX-UP STUNTS *for the Home*

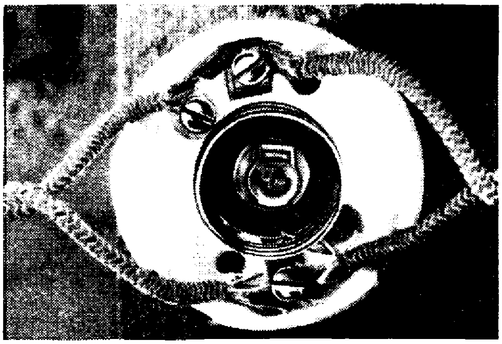
Readers who have hit upon simple, time-saving methods of repairing the thousand and one items of household equipment are invited to send in their ideas to the magazine. Those used will be purchased at regular rates.



Upper half of photo shows loose chair rungs; lower half, tourniquet clamp which holds parts in place while glue dries

Tapping in on Line

Frequently one wishes to tap in on an electric circuit to install an extra light bulb, or similar purpose. This can be done without cutting the wires, as indicated in the photo below. Simply unbraid the wire at the point where you wish to make the connection, and mount a porcelain base. Scrape off insulation to make contact.



Note how connection is made—two wires spread apart and insulation scraped away where contact is made with screws.

Regluing Loose Rungs in Furniture

Loose joints in glued furniture can usually be sprung far enough to enable anyone to scrape away old glue and apply any quick-drying glue, plastic wood cement or amberoid.

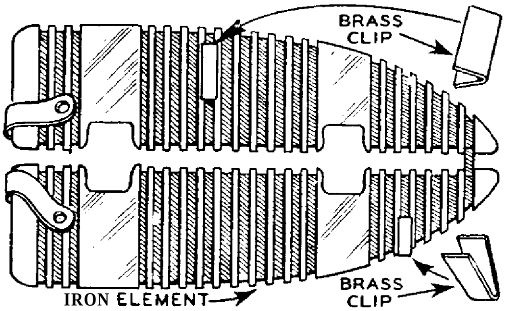
Use vinegar and a small brush for removing old glue. Wipe with a cloth soaked in warm water to remove surplus new glue.

Clamp or bind glued parts together till glue is set.

Chairs and other pieces of furniture are often awkwardly designed for the use of clamps, A simple tourniquet arrangement such as shown in the photographs at the left is then advised. Twisting the stick provides ample pressure to hold the freshly glued joints together. The end of the lever can be tied to one of the rungs.

Electric Iron Repair

Burnt out heating elements of an electric iron may be quickly repaired by use of a small brass clip, as illustrated below. If the break occurs at the edge of the element the clip should be clamped over the edge to shunt out the broken section. If disconnection occurs between edges, set the clamp on the surface as illustrated. The ends of the ribbon should al.ways be cleaned before the clips are applied.

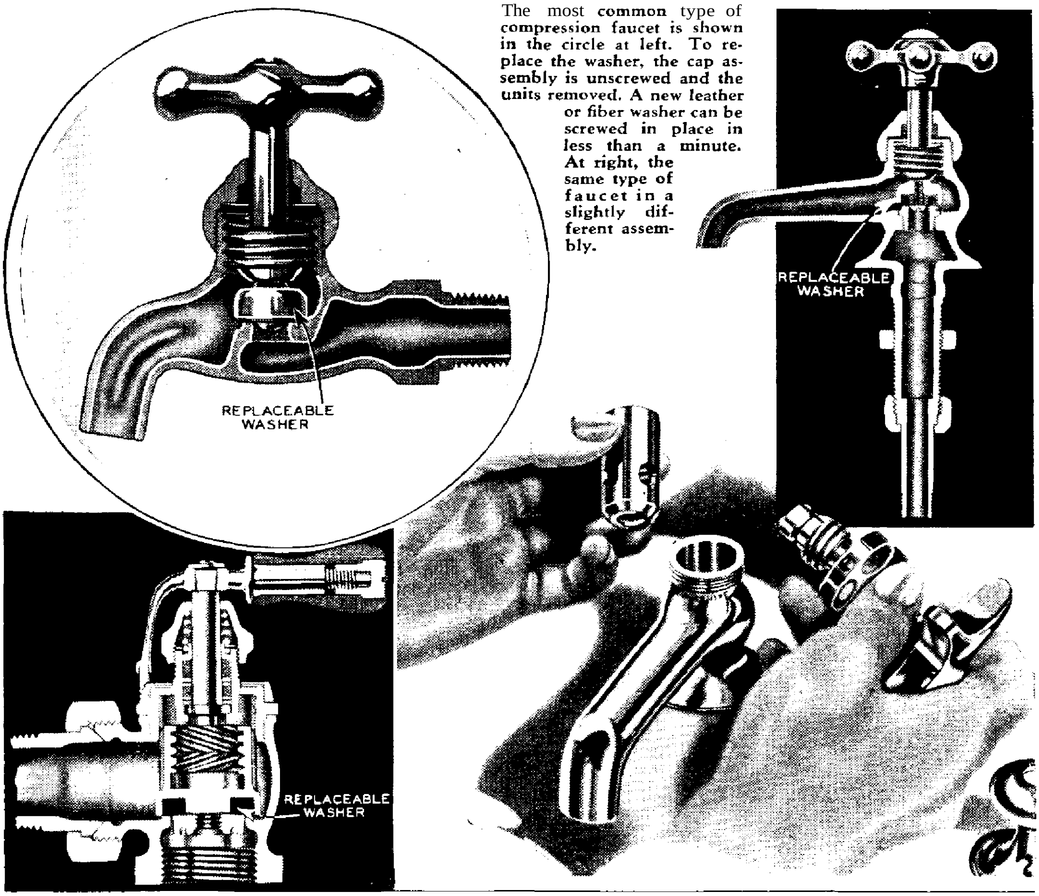


For repair, clamp the brass clips in positions shown above.

Alarm Clock Furnace Opener

By arranging weights so that they will open or close your furnace when released, an alarm clock can be installed which will release the apparatus, thus serving some of the practical purposes of a thermostat. The trigger should be attached to the key of the alarm wind so that it is tripped when the alarm goes off and the key starts turning. This arrangement saves running down to the furnace in early morning hours of bitter winter days.

Replacement of Faucet Washers Saves on Your Water Bills



The most common type of compression faucet is shown in the circle at left. To replace the washer, the cap assembly is unscrewed and the units removed. A new leather or fiber washer can be screwed in place in less than a minute. At right, the same type of faucet in a slightly different assembly.

At left above, a **self-closing** type of faucet actuated by *a* spring mechanism, **showing** location of **washer.** Right **above, showing** the ease with which **a** modern type of bathroom **faucet** can be disassembled for replacement of worn washers.

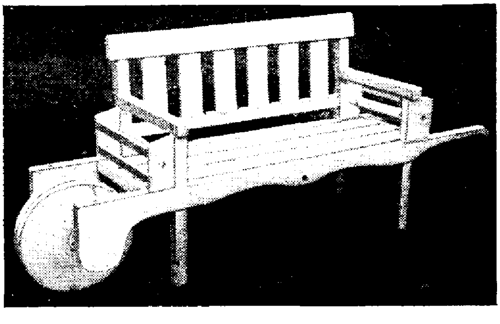
NOTHING is more annoying than a leaking faucet whose drip, drip, drip is a constant reminder of money being wasted on water bills. The repair of such a faucet is one of the simplest tasks of the home plumber and there is no excuse for enduring this petty annoyance.

The most common type of faucet is the compression faucet shown above. Practically all faucet repairs involve simply the replacing of a leather, fiber, or rubber washer that has become worn. First the water supply is shut off at the basement, or in lieu of this all other faucets turned on to reduce the pressure. Then the cap is unscrewed, the assembly removed, and the worn washer taken out by loosening the screw in its center which holds it. To replace, reverse the above routine.

Washers can be bought cheaply at the ten cent store or at your hardware, or in an emergency they can be cut by hand from suitable material. It is surprising the way water bills can be reduced if these simple faucet repair methods are adopted. It's a self-liquidating proposition!

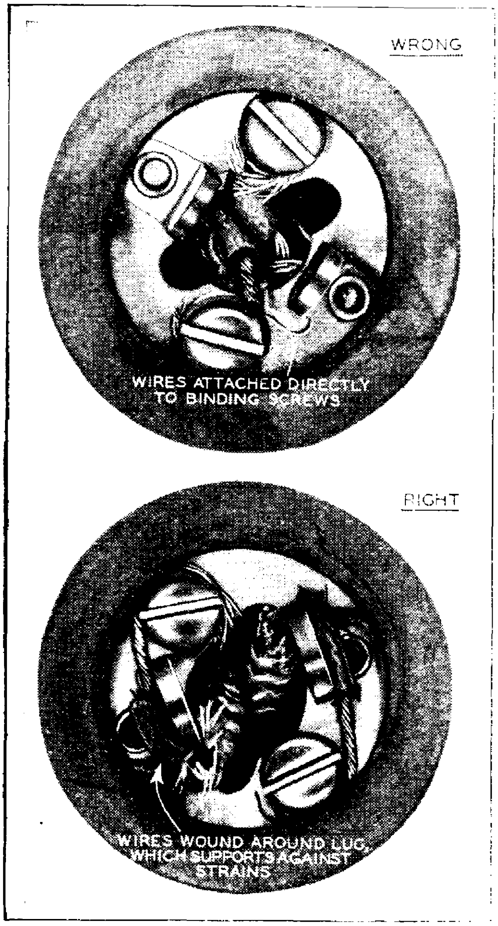
Making a Lawn Seat Portable

BY adding a wheel and handles to the lawn seat, as shown in photo below, this article of furniture can be made easily portable, and the design has a pleasingly modernistic touch. It's a good winter workshop project, to have completed and ready for use when springtime rolls around.



This "wheelbarrow" garden seat is portable and attractive.

How to Hook Up Electric Plug So Wires Won't Pull Out


WRONG
WIRES ATTACHED DIRECTLY TO BINDING SCREWS
RIGHT
WIRES WOUND AROUND LUG, WHICH SUPPORTS AGAINST STRAINS

Note that right way to connect wires is to wind them around lug before binding to screw; this supports against strains and prevents wires from being pulled out.

Patching Plaster

Patching plaster can now be purchased at most paint and hardware stores. It comes ready to mix, two parts of plaster to one of sand, with water until it is as stiff as can be worked.

Old plaster should be carefully removed before patching. All plaster which gives when pressed with the hand should be taken off with a putty knife or pointed trowel.

Wet the edges of the old plaster and the laths and, with a trowel, press on patching plaster, filling the break to within an eighth of an inch of the surface.

If a good sized surface is replastered, drive common nails through the new plaster into studding with heads well sunk into the plaster.

Allow this coat to dry, then scratch the surface with a screw driver and mix a finishing coat of plaster and water to about the same consistency (without the sand) and trowel on smoothly.

One of the commonest repairs which the home electrician is called upon to effect is replacing wires which have pulled out of their connecting socket. The two views at the left show the right and wrong methods of going about this simple task. The wrong way is to attach the wires directly to the binding screws, as shown in the top photo. Repeated strains on the wires eventually pull them loose when this hook-up is used, resulting in loose connections, short circuits, and occasionally dangerous fires.

The right method is to wind the wire around the base of the two projecting lugs, keeping the insulation on where contact is made with the lugs,

HEATING PLANT HINTS

Salt Your Fire

A handful of common salt thrown on hot coals of the fire will help keep the furnace clean. Generous salting each week is advised. Every month toss in a small sheet of zinc or an old doorbell battery. The zinc fumes combine with furnace gases to remove scale, cleaning out the system.

Watch Expansion Tank

Be sure there is plenty of water in your hot water plant if you are using that type of furnace. Most such furnaces are fitted with an extension tank located in some upstairs closet. A glass gauge on this tank reveals when the tank is well filled. If water is low in this tank, hunt for the water valve on the furnace and let in water till the tank gauge shows half full.

Repairing Insulation

Asbestos cement may be purchased at any hardware store for the purpose of patching or repairing insulation on furnace or pipes.

Cold Radiators

If one or more radiators of your hot water heating plant remain cold when a good fire is burning, hunt up the radiator key. It's usually in the bathroom medicine closet. Hold a cup under the end valve of the radiator, insert the key, turn to the left until air hisses from the radiator. When water spurts out, tighten the valve by turning the key to the right.

If any radiator is still chronically cold, follow its pipe circuit to find faulty insulation or add more insulation if the pipe runs too near an outside wall. Such a radiator is likely to freeze and burst in extreme weather if not attended to.

Clean the Water Heater

The gas heater furnishing hot water supply in most houses requires attention every few months to maintain its efficiency.

The burner should be taken out and boiled in a solution of sal soda. Dust and dirt should then be scraped from the copper coil and from the casing.

Correcting Leaky Flush Tanks Is Easy If You Know How

FLUSH tanks of the toilet are frequent Causes of trouble, usually in the way of leaks which, like loose faucets, can dribble away a surprising amount of money in the form of unnecessary water bills.

The accompanying photograph shows the operating mechanism of the conventional flush tank. The principle is simple. The hollow float is mounted on the end of a rod. When the water is flushed out, the float sinks and the rod pulls open the intake valve which permits water to flow again into the tank. The rising water lifts the float, thus closing the valve when the proper level is reached.

The flush valve is usually in the form of a rubber ball, which fits into a flared lip. In time this ball hardens so that it does not seat tightly, permitting a thin stream of water to trickle past it constantly. If this is the case, replace the ball with a new one, which can be purchased for a few cents. It does not pay to try to recondition an old one.

Perhaps the ball does not drop into correct position when the toilet is flushed, but lands offside. Check the alignment of parts to make sure that the arm which guides the ball is correctly centered. A simple screw adjustment will align properly.

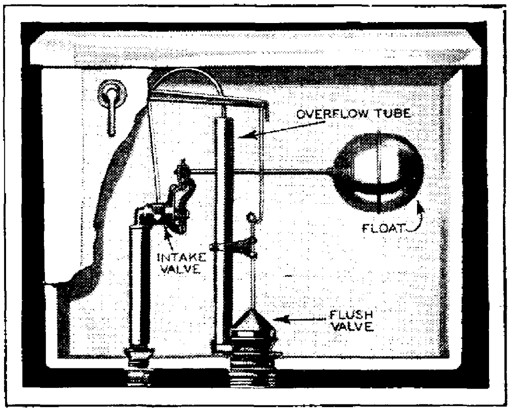
Another source of tank leaks is occasioned by failure of the float to rise high enough in the water to shut off the intake Valve before the level rises to the top of the overflow pipe. If the float rod is bent downward, the float will rest farther toward the bottom of the tank, and consequently will raise the rod to a greater degree when the water flows in, shutting off the intake valve as it should.

If none of these remedies stops the leak, check over all parts carefully to discover defective pieces. Washers in the valve system may have become worn; pipes may be corroded or threads eaten away. Soldering will frequently effect a permanent repair. In other instances replacement may be necessary.

Tightening Loose Handles

Don't throw away old screwdriver shanks when the handle splits from too many blows with a hammer. Turn out new handles, leaving a generous hole into which can be poured a mixture of hot sulphur (melted) with equal parts of rosin and old iron filings. This will anchor the tangs permanently.

A similar repair method can be used on kitchen knives and forks which have become loosened, as often happens with bone or composition handles. Sulphur is hard enough to be used as a base for heavy machinery, and this repair method is permanent. If a surplus of adhesive is used, the overflow should be scraped away before it hardens.



Operating parts of flush tank are shown in cutaway photo. Repair of various parts is explained in accompanying text.

Fixing Loose Screws

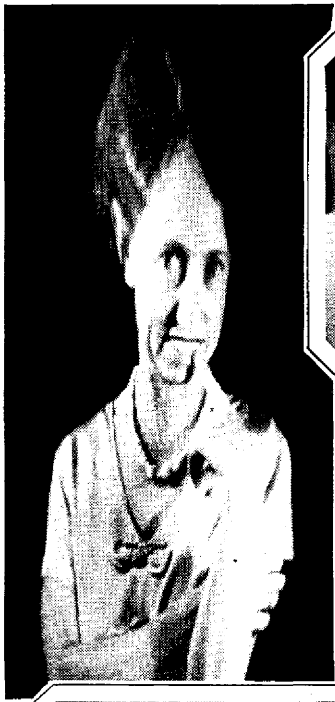
EVERY household is familiar with the annoyance pictured in the photo below, in which the screw holding a soap dish to the wall is no longer able to perform its function because the wood and plaster in which it sets have crumbled away.

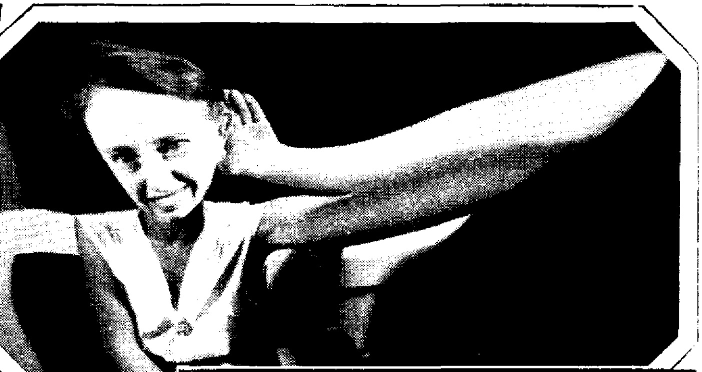
The simplest remedy is to remove the screw, clean out the hole and fill with plastic wood, leveled off flush with the surface of the wall. Permit it to dry thoroughly. The screw can now be remounted and will hold firmly in the new surface.

Another method which can be used if no plastic wood is available is that of driving a wooden plug into the chewed-up hole to a tight fit. Either of these repairs make it unnecessary to move to a new position.

When plastering becomes crumbled so that screws no longer hold, hole can be filled with plastic wood to give a new grip.

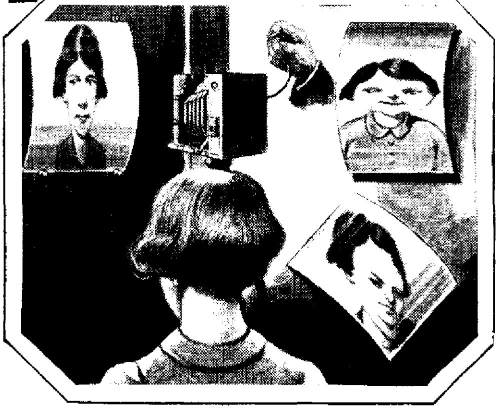
SQUEEGEE *Plate Makes Distorted Photos*





At left, photo produced by bulging plate upward in middle; above, by wedging top right corner of chromium plate closer to subject.

Believe it or not, the demon above is a gentleman of normally pleasant appearance. Surprising distortions can be obtained by alterations in the curvature of squeegee plate.



Camera should be placed a foot from plate, pointing toward center at a slight angle. Person or object to be photographed is placed several feet from plate. Effect can be seen by placing eye directly in front of camera lens.

FOUR thumb tacks and a chromium squeegee plate will enable you to take the most weird "comic Valentine" portraits you ever saw. The possibilities of curved mirrors in taking distorted photographs have long been known, but these mirrors are unobtainable in small sizes. Any photographic supply house will sell you a highly polished chromium squeegee plate, which serves as well as a mirror, for around a dollar.

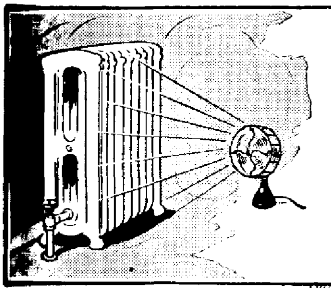
Fasten the plate by means of thumb tacks to a flat wooden surface, such as a door. The camera (any type will do) should be set about a foot from the plate, pointing at the center from a slight angle. The person to be photographed is placed several feet from the plate in such a position that the reflected image can be seen in the plate when the eye is placed directly in front of the camera lens.

The next step is to produce the desired degree of distortion by wedging up the edge of the plate at one or more places. You will be amazed by the queer and interesting distortions produced by the slightest change in the curvature of the plate.

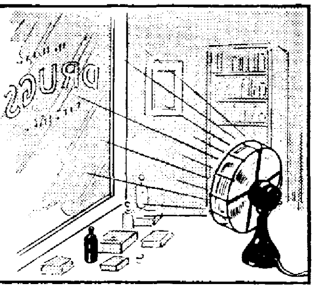
There are just two rules you must observe in taking distorted pictures by this method. The first is to increase the normal exposure ordinarily correct for the light and subject by at least fifty per cent. The second is to use a small stop in the lens, the smaller the better. If you use a large diaphragm opening, you will get nothing but a jumble of light and dark areas. The focusing is not at all critical and the enforced use of a small stop will cover up any errors.

In measuring the focusing distance, the sum of the distance of the camera from the plate, and the subject from the plate, should be taken.

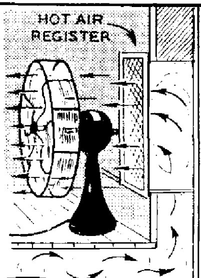
WINTER USES *for* ELECTRIC FANS

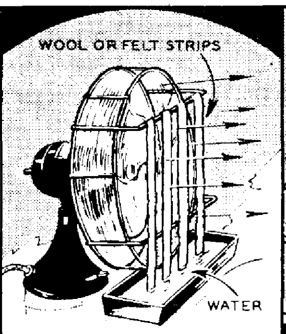


At **left**—**To** warm up an office quickly, set an electric fan to blow against radiator at an angle, setting up swift circulation of warm air. Even if fan is mounted permanently on wall, heat will be distributed more quickly by starting up the fan. At right, use of fan to blow against store windows from inside to keep off frost and ice so window-shoppers can see display.

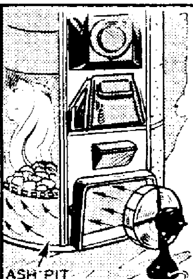


Hot air furnaces with long ducts work more rapidly if fan is backed up to the register, as shown, to start circulation of warm air.

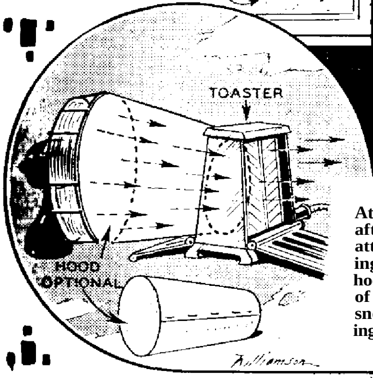




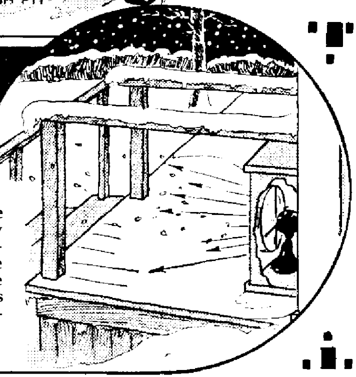
Wool or felt strips, suspended in front of fan, their ends resting in pan of water, make an excellent humidifier to remove dryness from the air.



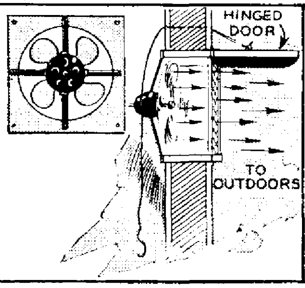
Use of a fan to improve draft through furnace fire-pot is shown here. The fan is placed in front of the open ash-pit door. Improves heating capacity of furnace.

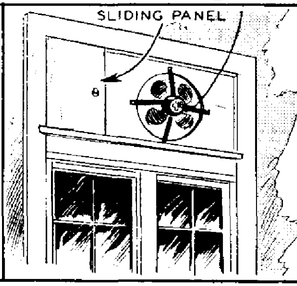


At left, a drying hot-air blast for use after shampoos, etc., can be made by attaching fan to toaster or other heating element with a metal hood. The hood is optional. At right, unusual use of electric fan in preventing dangerous snow and ice formations on steps during light snowfalls.

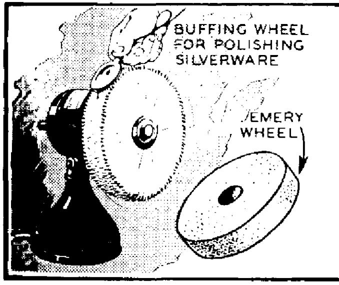


At a ventilator for the kitchen, the electric fan removes objectionable cooking odors. At right, one method of mounting, with a hinged door outside house operated by pull-string. Blast directed to outdoors.

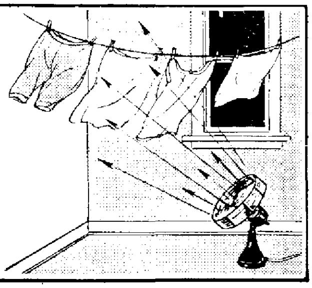




Another popular method of mounting the fan as a ventilator is to place it in a wooden frame which can be mounted above sash of window when it is partly open. Easily removable when not in use.



Motors used for driving electric fans have many uses. Blades are removed and small pulleys can be inserted on shaft for driving; also buffing wheels for polishing silver and emery wheels for sharpening can be placed. At right, drying of clothing inside house in stormy weather is speeded Up by directing blast from electric fan at them, hanging on line. This is the drying method, on a larger scale, used by designers of modern laundry equipment.



Why let your electric fan hibernate for the winter? These suggested uses will add considerably to household comfort.

“Penguinette”—a TOWER

A little washing machine motor can be belted down by Delta belting to a large propeller and be made to furnish enough wind to pull an airplane type car. This article tells how it's done.

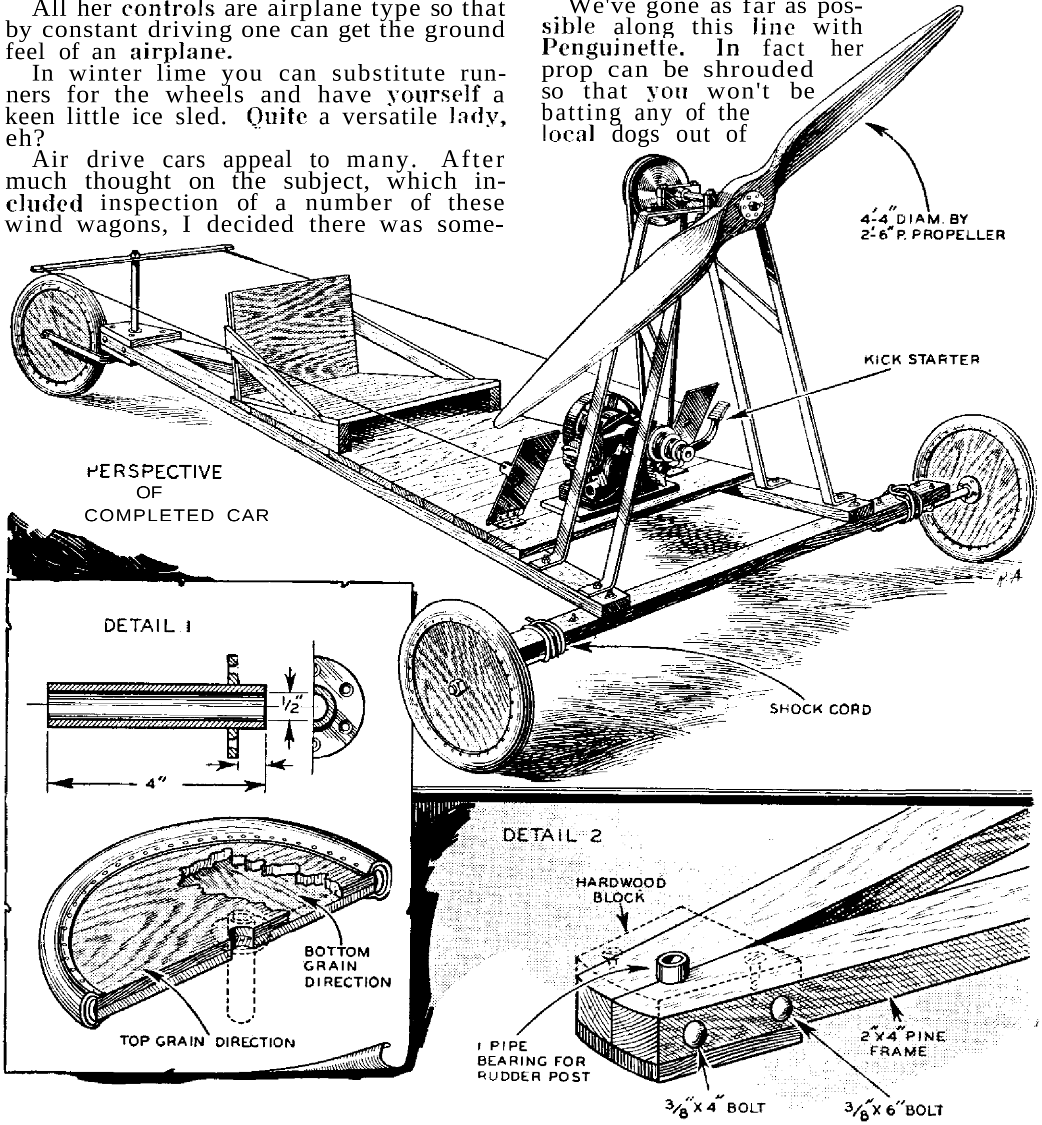
PENGUINETTE is *a* three wheel airplane type midget car built out of odds and ends. It has—or shall we say "she" has?—an airplane propeller, tractor type, belted to a little gas engine up in her snoot. She steers with her third rear wheel just the same way an airplane does when it taxies over the tarmac.

All her controls are airplane type so that by constant driving one can get the ground feel of an airplane.

In winter lime you can substitute runners for the wheels and have yourself a keen little ice sled. Quite a versatile lady, eh?

Air drive cars appeal to many. After much thought on the subject, which included inspection of a number of these wind wagons, I decided there was something to the idea after all in spite of the holes that could be picked in the mechanical and the aerodynamical side. And why not get real airplane flavor into the thing? After all the main reason for driving a set of wheels by airplane propeller is to give grounded kiwis all of the thrills without any of the usual hazards.

We've gone as far as possible along this line with Penguinette. In fact her prop can be shrouded so that you won't be batting any of the local dogs out of


4'-4" DIAM. BY
2'-6" P. PROPELLER
KICK STARTER
PERSPECTIVE
OF
COMPLETED CAR
SHOCK CORD
DETAIL 1
1/2"
4"
BOTTOM
GRAIN
DIRECTION
TOP GRAIN DIRECTION
DETAIL 2
HARDWOOD
BLOCK
1 PIPE
BEARING FOR
RUDDER POST
3/8" X 4" BOLT
3/8" X 6" BOLT
2" X 4" PINE
FRAME

Layout of the parts of the Puffmobile are clearly shown above. The axle bearings for the built-up type wheels are made of tube with a welded collar. Right, stern Dost construction. Motive power furnished by washing machine motor.

PUFFMOBILE

by **WESTON FARMER**

the way, or getting hamburgered yourself, and in making her tread wide we have followed out the safety plea, killing two birds at once; wide tread prevents tipovers, and wide tread (in relation to length) gives airplane quickness of handling. A ground loop is perfectly possible with Penguinette. You'll have to be a pretty fair ground flier to run her.

Let's departmentalize our design, and build her as we discuss the pros and cons of each element.

Chassis

Everything nowadays, to stand a chance of getting built, has to be simple. That was our first requirement.

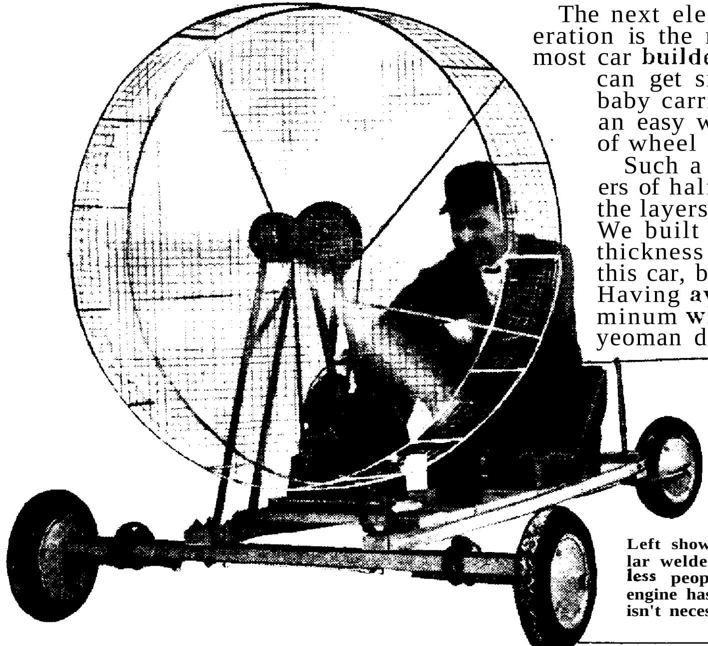
So we doped out the simplest kind of chassis. Merely a three cornered frame, somewhat like an ice boat, with cross decking of half inch spruce. The average fuselage width on the light airplanes we have seen is about 22 inches. The average length of fuselage is 2½ times the tread of landing gear on an airplane. These facts, since we wanted our puffmobile to handle like a ship, determined our proportions.

The result is shown in the design drawing accompanying this article. Being dimensioned and labeled, this drawing is fully explanatory, and nothing regarding the making of the chassis needs to be added. The 1¾" by 3" spruce longerons are joined with carriage bolts at the ends and across the axle beam. The seat is of simple short wooden pieces, nailed with 6 D nails. Likewise the cross boards are nailed with 6 D nails, and sawed flush with the longerons.

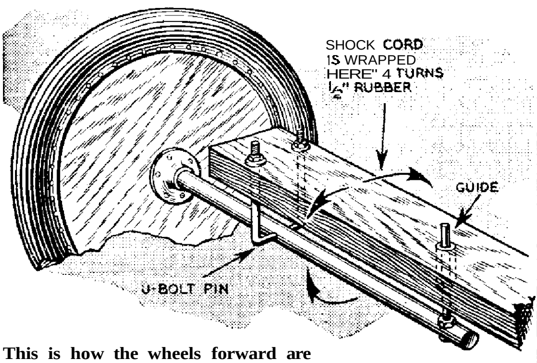
Wheel Suspension

The next element coming up for consideration is the matter of wheels. This, for most car builders, is a sore subject. Some can get small bicycle wheels, others baby carriage wheels, others can find an easy way out by making the type of wheel shown here.

Such a wheel is made of three layers of half inch white pine glued with the layers running crosswise in grain. We built up wheels of oak in single thickness when experimenting with this car, but they failed on side loads. Having available a de luxe set of aluminum wheels we impressed them for yeoman duty while making tests and taking pictures, and they work very well. We use the same collars which were made for the single grain wooden wheels. These collars are of ½" by 4" shelby steel tubing from an old airplane

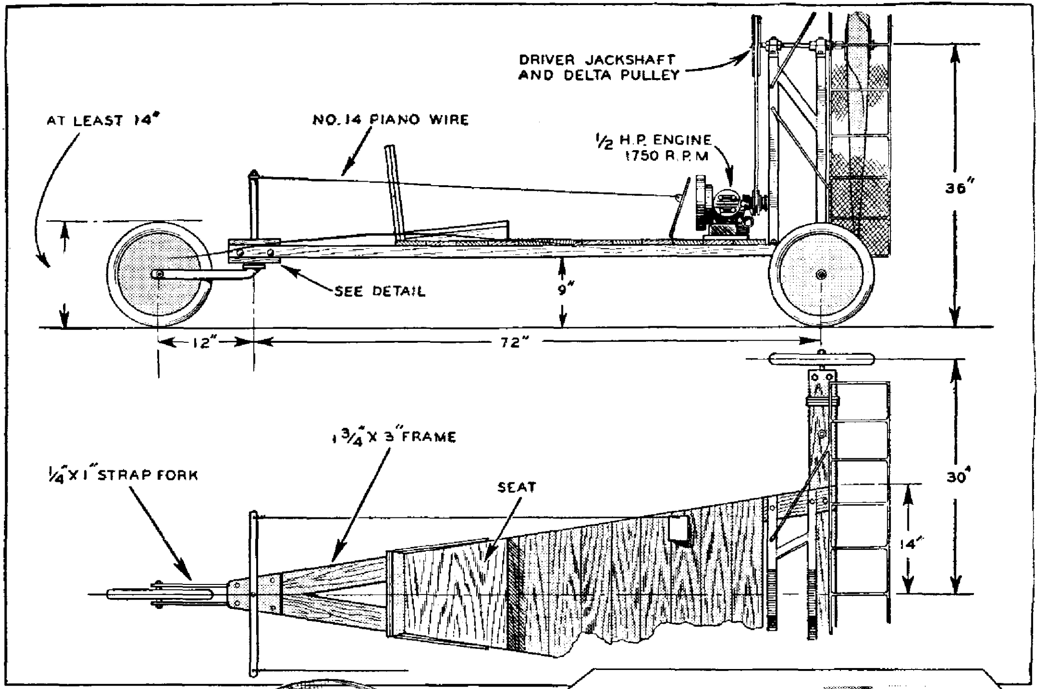


Left shows how wire netting is run on *a* tubular welded frame to keep stray dogs and careless people from getting hamburgered. The engine has a kick starter so access to the prop isn't necessary. Shot below shows steering post.

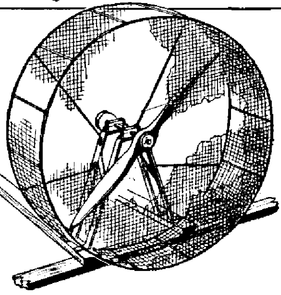


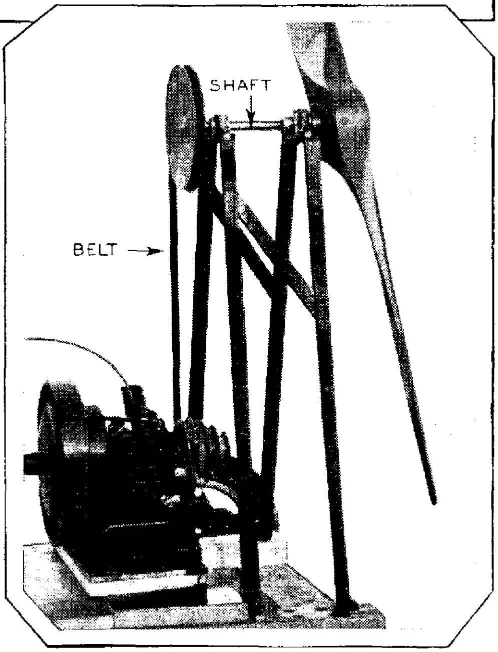
This is how the wheels forward are sprung. The U bolt acts as a trunnion. There is a guide hole. AXLE DETAIL

Simplicity Marks Layout of Pupmobile; Is Easy to Build and Inexpensive



Above, major dimensions for car. The stand is of welded strap construction and the propeller shaft turns in die cast saw mandrels as sold by all hardware firms for home circular saw construction. Right shows the way the net is installed for safety's sake. Engine has a kick starter.





The engine is mounted 20" below the center of the jack shaft and the stub shaft on the engine is equipped with a Delta V drive countershaft pulley. The jackshaft is equipped with an 8" V drive Delta pulley. The most effective drive ratio is 2 to 1.

fuselage, with small flanges welded on, about ½" through, to which screws could be fastened. Since taking the pictures we have completed one two ply wheel and two three ply wheels. Both are working very nicely and serve the purpose well. The rims are covered with double layers of old inner tube artfully feather edged at the splices and tacked down with box nails along the edges of the rim. Through these the collars are fastened.

All easily procurable small wheels of between 12 and 16 inches diameter have one fault in common. The axle holes are seldom more than ⅜" in diameter if indeed they are that large.

And the hubs are narrow. These two things mean that bearing friction of the wheels robs the proposed car of almost all its power and pep.

The same thing is true of the kind of wheels taken from the common or garden variety of boys' coaster wagon.

How to get around this objection?

By using wheels of decent diameter and by seeing that the bearings are at least 4" long, and ½" diameter or over, at that adequate provision for oil is given.

It is almost too much for an old timer like me to expect that readers will heed this advice and follow out pretty substantially

(Continued on page 139)

Junkyard Parts Make This Efficient Workshop Spray Gun

THERE'S nothing quite so serviceable around a workshop or garage as a spray gun for doing up paint jobs. This one will win a warm place in the heart of any workbench fan, one of the reasons being that it can be built from old stray parts that can be picked up in any junkyard.

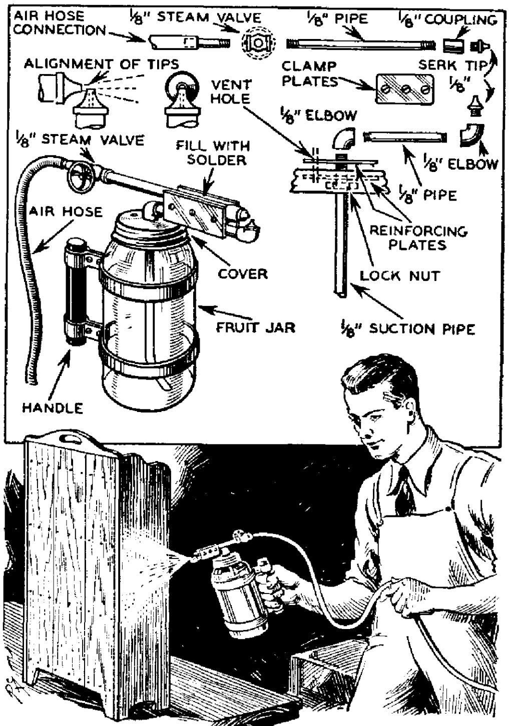
All construction details are to be found in the drawing at the right. The Zerk lubricating tips shown have to be disemboweled; that is, the spring and ball have to be removed from the innards, after which they make wonderful atomizer tips.

It is advisable to use a quart jar, as the gun will spray out about a quart of paint in seven minutes, when air at 60 pounds pressure is applied. It handles exceptionally heavy paint for an air gun.

The reinforcing plates mentioned are circular brass 1/16 in. thick. As for the lengths of the pipes, they had best be cut according to the length of the pipe; that is, get the jar first, then cut the pipe to fit. The suction pipe going down into the pipe must clear the bottom by at least an eighth of an inch.

Notice that a pair of clamp plates hold the two pipes with the Zerk tips together. It is advisable to put a little paint in the jar and adjust the tips to the proper relation to each other before soldering the clamps in position.

When the gun is in operation it will be found that it often clogs, but this may be remedied by placing the thumb and forefinger over the tips in such a manner that the air is blown back into the jar.



Assemble the parts for the spray gun as illustrated here. The Zerk tips should be adjusted to their proper position, then the clamps should be bolted together and the space between filled with solder. Suction pipe should clear bottom by at least one-eighth inch for the best results.

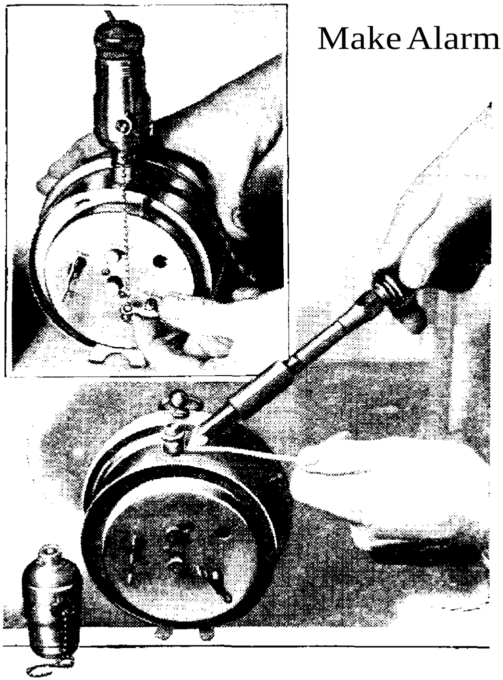
Make Alarm Clock Turn on Electric Heater, Lights

GOT any particular electrical switch you want turned on in the morning before you get up? If so, here's the way to work over your alarm clock to make it operate the switch for you.

First remove the alarm from your Big Ben. Where the bell was you will find a hole about a half inch in diameter. Now into this hole insert a bushing of the type used in electrical fixtures. Your electrical dealer will supply you with this part. On the side of this bushing you should bore a hole for the exit of the power wires.

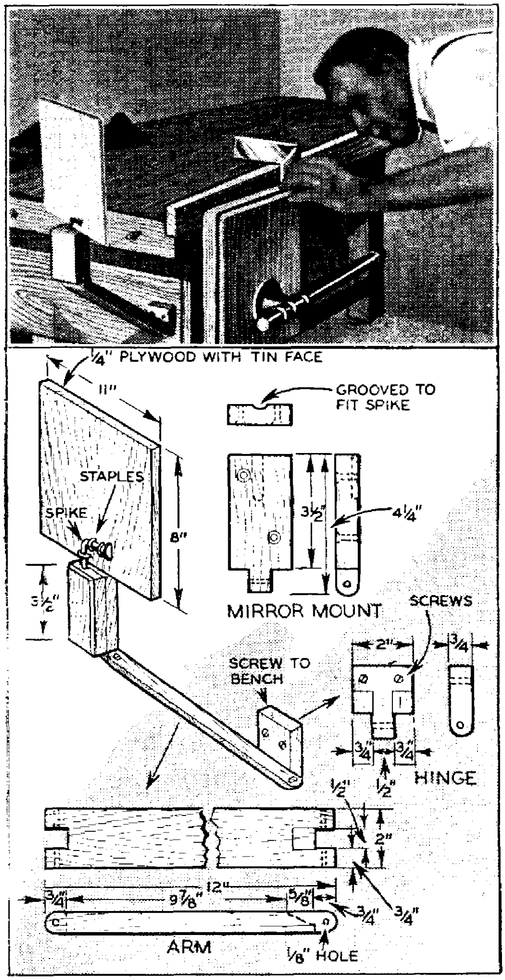
Your next job now is to screw the socket into this bushing, the results of which act are shown in the accompanying photo. The chain hanging down is shortened somewhat, and inserted in the hole in the alarm key. The electrical apparatus is then hooked to the wire coming out of the plug, while the power source is hooked to the wire passing through the bushing.

With this arrangement, when the alarm goes off and the key turns, the chain will be pulled, turning on the current. You can set the alarm for any time you wish, of course. Make sure you use a sturdy pull-chain socket as it has to stand heavy punishment.



Insert the bushing in the alarm bell hole and solder in place as shown. Note how chain is held in hole in alarm key.

Adjustable Mirror for Workbench Throws Light on Work



Detailed dimensions for all parts are shown in the drawings above. The mirror reflects light on the work as shown.

A SQUARE reveals little when used on the edge of a board in a vise, if the vise end of the bench faces a dark corner. An adjustable tin mirror screwed to the bench where it can be turned to reflect light from a window or door along the board is a great convenience in such cases. It can also be used to throw more light for laying out or carving.

Shaping Parts for the Mirror

In making the gadget shape a jointed arm of 1-in. stuff about 2 in. wide, as illustrated in the accompanying drawing. Cut a ½-in. notch in each end, and round the projections to a radius of half the thickness of the stock. A hinge piece, with a tenon rounded on the end to fit the mortise, is made to screw against the bench end; and a similar longer piece mounts the mirror.

Assemble the three pieces, drill the bolt holes, and reassemble. To permit the arm to be raised to an angle of 45 degrees, notch the hinge and arm where they touch.

The mirror is a piece of thin plywood with a piece of tin tacked on one side. Bend a spike at right angles for a pivot, attaching it with staples or screws.

Making Pivot for Mirror

Cut a shallow groove in the mount to take the pivot, and screw to its back a grooved block of the same size. Tighten the bolts until they will hold the mirror in any position they are put. When not in use, fold the mirror down toward the floor.

You'll find it advisable to rub the mirror up to a high polish occasionally. This will make for a better reflection of light along the edge on which you're working. A can of metal polish with a good rag should be kept handy at all times for the polishing process. The photo at the left gives a clear idea as to how the mirror acts in operation.

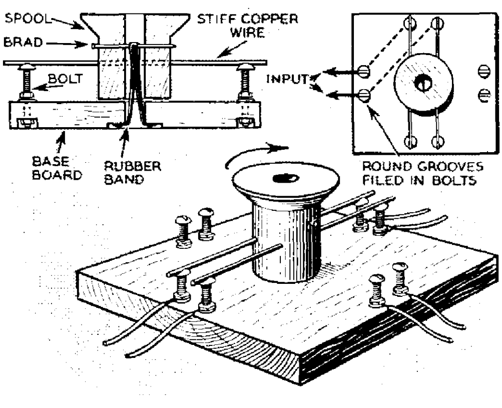
In case there is no window to reflect the light, a 60-watt lamp will do the job fairly well.

D.P.D.T. Switch for Electrical Experimenters Made From Spool, Screws

MANY is the time the young electrical experimenter wishes for a D.P.D.T. switch by which a source of electrical energy can be switched directly from one piece of apparatus to another. Here is just the thing for the job.

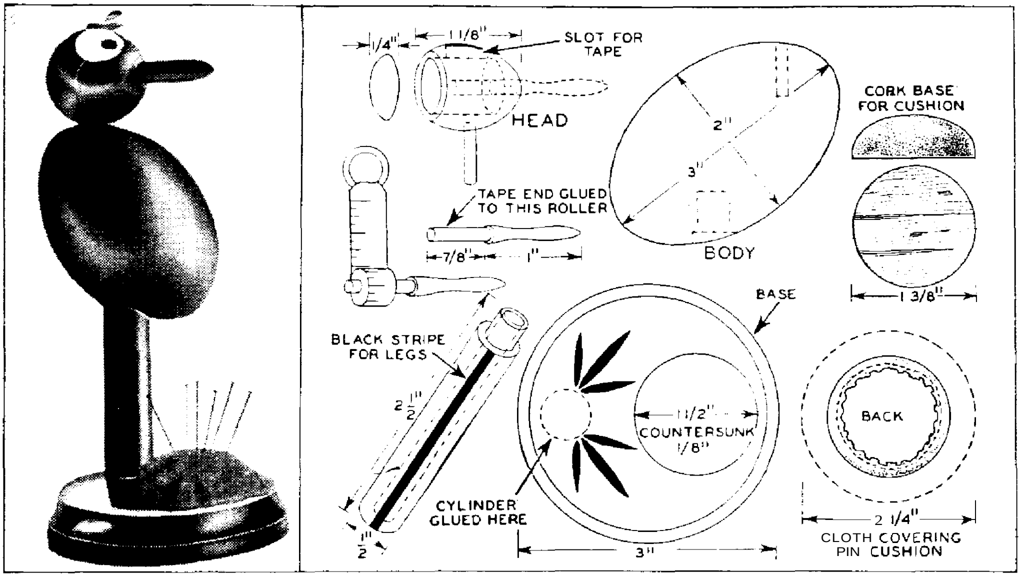
First consult the drawing shown at the right. The baseboard is four inches square, and the screws are set in a circle 3 inches square. File out the slots in the bolt heads so the heavy wire provided will lie nicely in them.

The switch is made from a spool sawed in half. Through the smaller position is run two stiff copper wires and a small brad. This latter part takes a rubber band which gives the switch elasticity. Wire the switch up according to your needs. A hookup for switching the power from one instrument to another is shown in the drawing at the right.



Stiff copper wires act as contact arms for the switch. They rest in the grooves in the bolt head to close the circuit.

A Handy Gadget for Sewing Purposes



Here is a gadget that is handy for people doing considerable sewing. It contains a pin cushion, tape measure and darning ball. Construction details are shown at the right. Note especially how the head and beak are put together.

THIS queer looking gadget is really one of the handiest devices imaginable for women who do considerable sewing. It includes a pin cushion, tape measure and an egg-shaped body for mending purposes. Any handy man can construct it in a short time at little expense.

The base is 3 in. in diameter with a 1½" circle countersunk ⅛" on the surface. This latter circle is used as a base for a cork pin cushion of 1⅜" diameter. The cork is then covered with a cloth circle 2¼" in diameter. The legs are constructed out of a 2½" wooden cylinder ½" in diameter.

Black strips are painted down the sides to give an appearance of legs. One end of the cylinder is glued into the base back of the pin cushion, with the other end attached loosely to the egg-shaped body. The body is 3" long and 2" wide with a curved surface. Two holes are drilled in it, one used to attach legs and the other, the head.

The head is 1⅛" long. It is hollow inside where the tape measure is located. The beak or roller is 1⅞" long, 1 in. being outside the head and the other ⅞" inside to hold the tape which is glued into place. A slit at the top allows the measure to be pulled out when used. Eyes are painted on the head as decoration. Comparatively inexpensive, the gadget offers an easy way of making spare time money for energetic people. Any up-to-date housewife can make use of such a contrivance.

Statue Modeled Out of Newspapers Makes Attractive Wall Decoration

This statue was modeled out of old newspapers which were soaked in hot water and electroplated.

HERE is a nifty scheme to decorate the walls of your home cheaply and artistically. It provides much fun as well as practice in the art of sculpture. First take a batch of old newspapers and soak them to a pulp in hot water. Then, using any subject that suits your fancy, shape the head features until a close resemblance to the model is obtained. When modeling is completed, dry the statue over a drying oven. A light bulb in a large tin can may be used for this purpose. A covering of wax will fill in the rough places and act as a base.

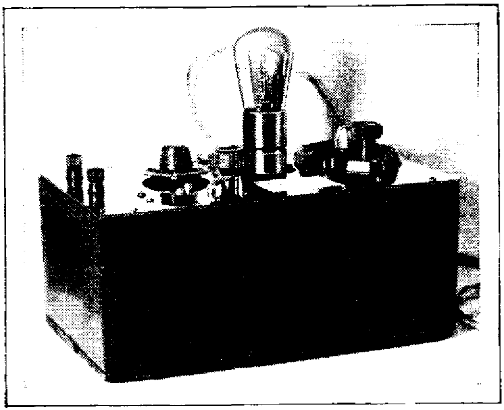
The last step consists of entirely covering the model with powdered graphite (soft pencil leads), and copper plating in a copper sulphate bath. The whole process takes but a short time and the materials used cost practically nothing. The finished statue resembles solid bronze, as shown in the illustration on the left. It is lighter than a picture frame and makes a neat appearance upon the wall of a living room. The model used in the illustration portrays the scientist Mendelejeff, a famous investigator of electroplating.

Listen in on Police CRIME

by THORNTON HALLET

Down on the short waves police radio stations are constantly transmitting orders to squad cars cruising about the city on the lookout for lawbreakers. With this little call-box hooked to your broadcast set you can tune in on these signals and thus have a virtual ringside seat at battles waged by police against criminals.

The Police Call-box set up for an exciting evening at listening in to calls from police headquarters to squad cars.



Here's how your call-box will look when completed. The flexible cord leads to the base in the receiving set.

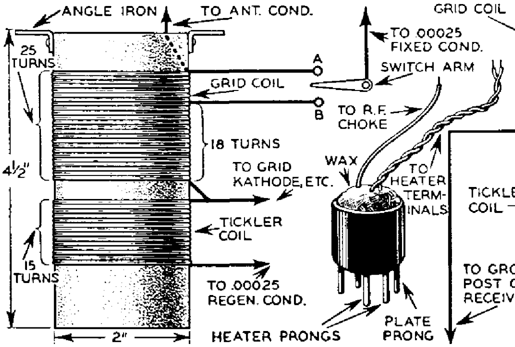
"CRUISER number 16. Go to Corner of Chestnut and Main Street. Suspicious man lurking about.—Cruiser number 4. Proceed cautiously up Empire Road and follow Taxi number —. Escaped convict said to be passenger."

Do you get this kick from your broadcast receiver? If you don't then you better build one of these Police Signal Call-boxes and get all the thrills of a hair raising movie, from real life.

The construction is very simple. First you will need a panel of bakelite, hard rubber or thin dry wood. And as this call-box was built only from what could be found about the shop, any definite measurements or specifications would be useless. Circuit constants however should be about as given.

Dimensions best to follow are given in Figs. 3 and 4. Drill panel holes about as indicated so your particular condensers, socket, etc., can be arranged somewhat as indicated in Figs. 3 and 4.

Following the schematic diagram you can then wire up in connection with the picture diagram (Fig. 2) which should


ANGLE IRON
TO ANT. COND.
25 TURNS
4½"
15 TURNS
2"
A
B
GRID COIL
18 TURNS
TO GRID KATHODE, ETC.
TICKLER COIL
TO .00025 REGEN. COND.
TO .00025 FIXED COND.
SWITCH ARM
TO R.F. CHOKE
WAX
TO HEATER TERMINALS
HEATER PRONGS
PLATE PRONG
TO GROUND POST OF RECEIVER
GRID COIL
TICKLER COIL

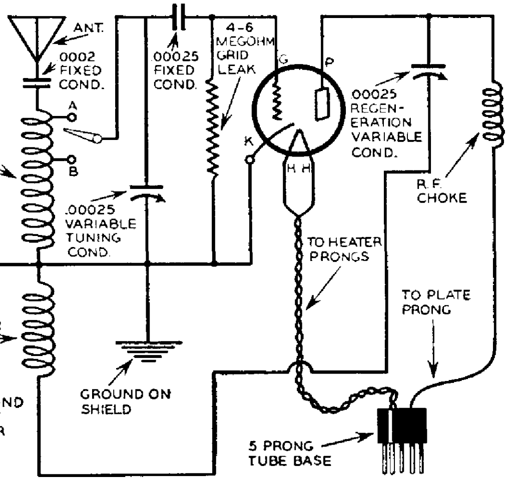

ANT.
.0002 FIXED COND.
.00025 FIXED COND.
4-6 MEGOHM GRID LEAK
A
B
G
P
K
H H
.00025 VARIABLE TUNING COND.
.00025 REGENERATION VARIABLE COND.
R.F. CHOKE
TO HEATER PRONGS
TO PLATE PRONG
GROUND ON SHIELD
5 PRONG TUBE BASE

Fig. 1. Wind the grid and tickler coils on the same form following the dimensions given at the left. The form is mounted under panel with the angle irons. At right is seen the circuit. The tube is a 227 generally used in broadcast sets.

WAR With Broadcast Set

make it very easy for anyone to hook up without error.

What to do about the grid and tickler coils? For this rig use a 2 inch form about 4 inches long. The grid coil consists of 25 turns of No. 22 DCC wire wound close together. Tap off at the 7th turn from top end. The tickler consists of 15 turns of same size wire with about ½ inch spacing between the two coils. Flood the turns with Duco cement to hold them from slipping. This coil form can be mounted vertically under the panel with two little angle "irons."

Making the Receiver Plug

The plug is made from a discarded 5 prong tube. Knock out the bulb and remove the leads from inside the prongs. Then solder the aforementioned wires into the two heater and plate prongs and fill the shell with wax to support the wires.

The inside of the box can be lined with a tinfoil shield by shellacking the wood and foil and then, when they are tacky, spreading the foil smoothly in place all around the inside. Bring the foil at one end up and over the edge to make positive contact with the strip under the ground binding post. Paint the box any suitable color outside. Then fasten the panel and the "works" in place and you are ready to hook up to the receiver.

Remove the antenna from the receiver and attach to ant. post of the call-box. Then connect the ground post to the ground post of the receiver. Remove the detector tube from the receiver and place it in the call-box socket and insert the plug into the detector socket of the receiver. Turn on the receiver. This should light the call-box tube. If it doesn't, investigate the plug wiring from plug to socket.

When the receiver has warmed up you will hear the usual rushing sign. Turn the regeneration condenser about half way in and then slowly turn the tuning condenser. The dial should be a vernier for line tuning. Don't be in a rush. Short wave work takes much more careful tuning than the broadcast band. If you hear a whistle in the speaker back off the regenerator until the signal clears up. It may be code or it may be voice.

Tuning for a Police Station

With switch arm on A you will hear the calls lying in the 120 meter band and with it on B you can reach the bottom of the broadcast band with the police calls just below. In between will lie the code and phones of the amateurs working on the 160 meter band.

When a station is found the volume can be built up to its loudest point with the regenerator. Then carefully readjust the tuning condenser until you get the loudest and clearest signal.

Remember that with the call-box shown in the photos and herein specified the two variable condensers were of the 11 plate variety and the coils wound as specified. If you have no 11 plate condensers (cap. .00025) you may use 9 or 13 plate affairs but this will affect the windings of the grid coil somewhat. For a 9 plate tuning condenser you will probably have to have nearly 30 turns to the grid coil or for a 13 plate tuner the coil can be reduced to per-

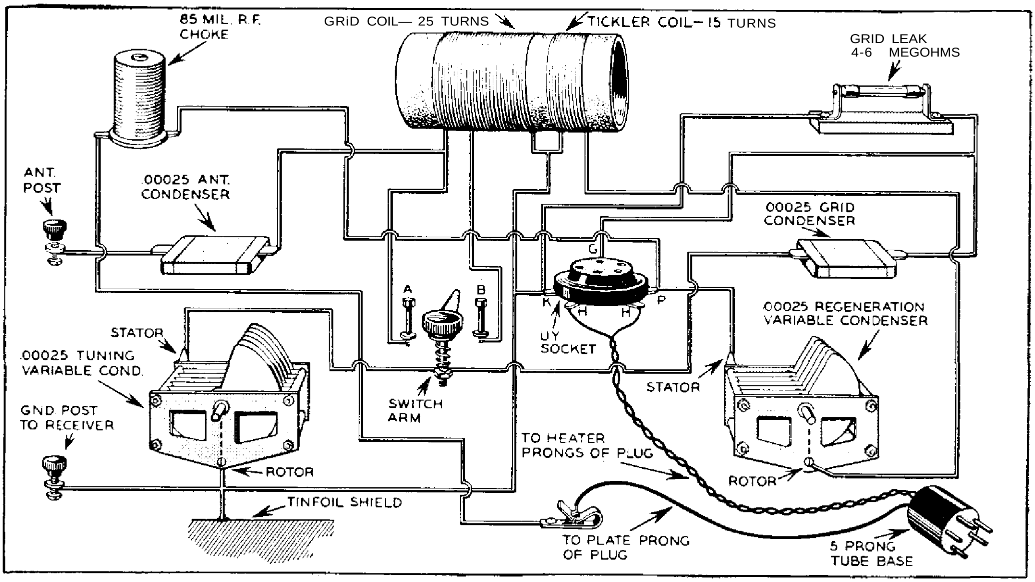
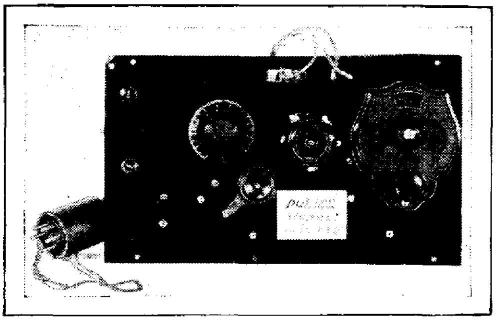

85 MIL. R.F. CHOKE
GRID COIL— 25 TURNS
TICKLER COIL— 15 TURNS
GRID LEAK 4-6 MEGOHMS
ANT. POST
.00025 ANT. CONDENSER
.00025 GRID CONDENSER
G
A
B
K
H
H
P
UY SOCKET
.00025 REGENERATION VARIABLE CONDENSER
STATOR
.00025 TUNING VARIABLE COND.
GND POST TO RECEIVER
SWITCH ARM
STATOR
TO HEATER PRONGS OF PLUG
ROTOR
ROTOR
TINFOIL SHIELD
TO PLATE PRONG OF PLUG
5 PRONG TUBE BASE

Fig. 2. This picture diagram will make the hook-up easy for you. Run your wires according to the arrangement shown, keeping all leads as short as possible. Note that rotor of tuning condenser leads tinfoil on the inside of the cabinet.

Police Call-box Can Be Assembled From Spare Parts in Radio Workshop



Top view of call-box. Tuning condenser dial *is* seen at right, regeneration condenser dial at left, tube socket in center.

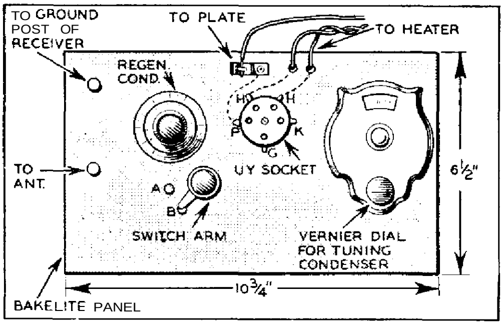
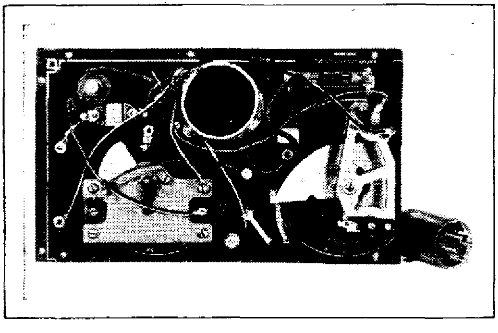

TO GROUND POST OF RECEIVER
TO PLATE
TO HEATER
REGEN. COND.
H
H
P
K
G
UY SOCKET
TO ANT.
A
B
6½"
SWITCH ARM
VERNIER DIAL FOR TUNING CONDENSER
10¾"
BAKELITE PANEL

Fig. 3. This drawing, in conjunction with photo at top of page, will give you lucid idea as to efficient layout of parts.



Rear view of the panel. The tuning condenser should have plenty of room to swing in. Coil form is seen at top center.

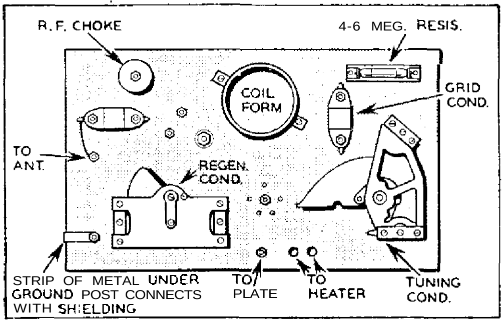

R.F. CHOKE
4-6 MEG. RESIS.
COIL FORM
GRID COND.
TO ANT.
REGEN. COND.
STRIP OF METAL UNDER GROUND POST CONNECTS WITH SHIELDING
TO PLATE
TO HEATER
TUNING COND.

Fig. 4. Here's how you should arrange parts on the back of the panel. The strip of metal under the ground posts connects with the tinfoil in cabinet to provide ground.

haps 22 turns. This is only approximate and will call for some little experimentation. Better stick to the prescribed capacities, however, if possible, as the coil turns specified work admirably with the condensers specified.

Use a long antenna for picking up these police signals because with this arrangement no RF is used ahead of the detector and the usual short inside antenna or wall tape is next to useless. An antenna wire around 100 feet will do nicely.

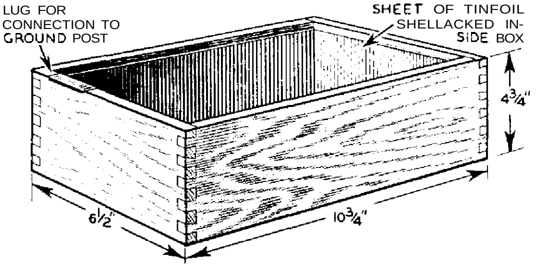
Stations You Can Listen For

Below is a fairly complete list of police stations using broadcast transmitters. As before stated, they are banded together in wavelength above and below the Amateur Band and switching over from A to B will enable you to bring in either section at will. Amateur telephony will also prove interesting when police calls lag. If situated away from cities the police calls will not be heard much except during evening hours but if you are situated in or near a city using this police system then you should be able to hear the calls at about any time.

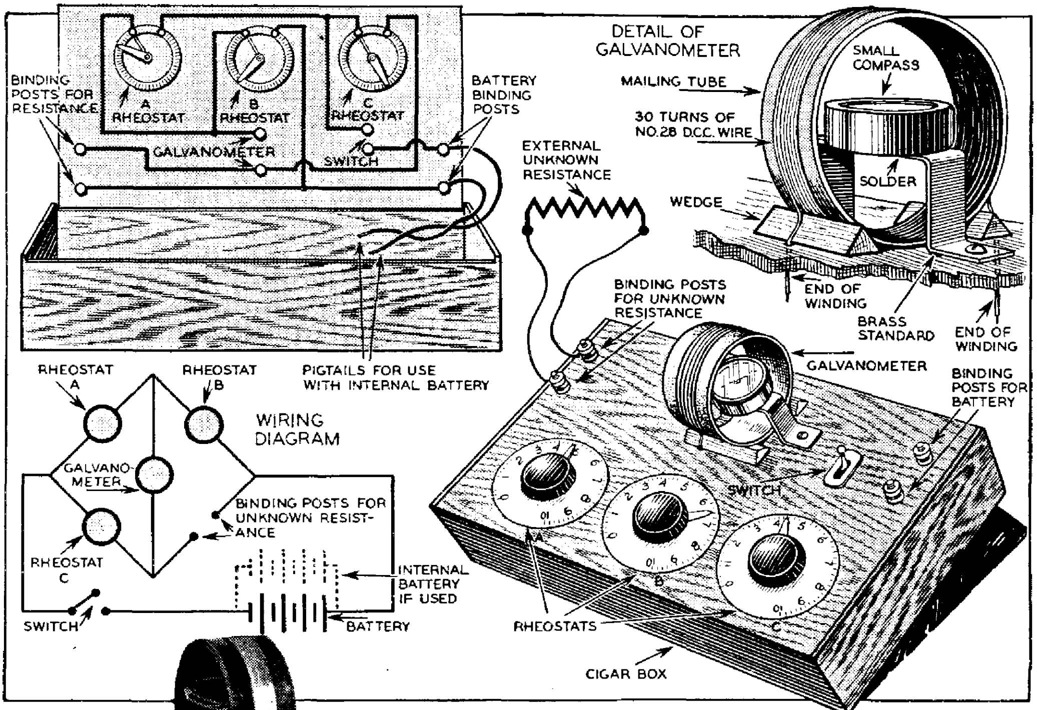
Police Radio Stations in U.S.

Wave-length (Meters)	Frequency (Kilo-cycles)	Call Letters	Location
121.5	2.470	KGOZ	Cedar Rapids, Ia.
		KGPN	Davenport, Ia.
		WPDZ	Fort Wayne, Ind.
		WPDT	Kokomo, Ind.
		WPEC	Memphis, Tenn.
		KGPI	Omaha, Neb.
		WPDP	Philadelphia. Pa.
		KGPD	San Francisco, Cal.
		KGPM	San Jose, Cal.
		WRDQ	Toledo, Ohio
122.0	2,458	WPDO	Akron, Ohio
		WPDN	Auburn, N. Y.
		WPDV	Charlotte, N. C.
		WRDH	Cleveland, Ohio
		WPDR	Rochester, N. Y.
		WPEA	Syracuse, N. Y.
122.4	2,450	WPDK	Milwaukee, Wis.
		WREE	New York, N. Y.
		WPEF	New York, N. Y.
		WPEG	New York, N. Y.
		KGPH	Okla. City, Okla.
		KGPO	Tulsa, Okla.
		KGPZ	Wichita, Kans.
122.8	2,422	KGPX	Denver, Col.
		WPDF	Flint, Mich.
		WPEB	Grand Rapids. Mich.
		WMDZ	Indianapolis, Ind.
		WPDL	Lansing, Mich.
		WPDE	Louisville, Ky.
		KGPP	Portland, Ore.
		WPDH	Richmond, Ind.
123.4	2,430	WPDI	Columbus, Ohio

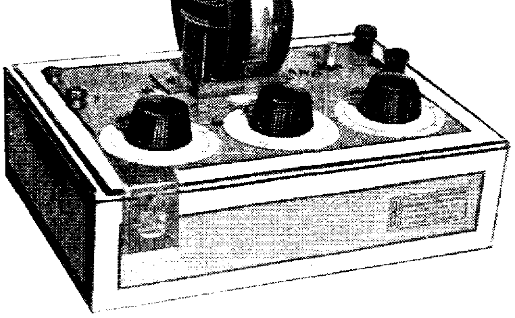
(Continued on page 138)


LUG FOR CONNECTION TO GROUND POST
SHEET OF TINFOIL SHELLACKED INSIDE BOX
4¾"
6½"
10¾"

Simple **Wheatstone** Bridge for Electrical Experimenters


BINDING POSTS FOR RESISTANCE
A RHEOSTAT
B RHEOSTAT
C RHEOSTAT
BATTERY BINDING POSTS
GALVANOMETER
SWITCH
PIGTAILS FOR USE WITH INTERNAL BATTERY
RHEOSTAT A
RHEOSTAT B
WIRING DIAGRAM
GALVANOMETER
BINDING POSTS FOR UNKNOWN RESISTANCE
RHEOSTAT C
INTERNAL BATTERY IF USED
SWITCH
BATTERY
DETAIL OF GALVANOMETER
MAILING TUBE
SMALL COMPASS
30 TURNS OF NO.28 D.C.C. WIRE
EXTERNAL UNKNOWN RESISTANCE
WEDGE
SOLDER
END OF WINDING
BRASS STANDARD
END OF WINDING
BINDING POSTS FOR UNKNOWN RESISTANCE
GALVANOMETER
BINDING POSTS FOR BATTERY
SWITCH
A
B
C
RHEOSTATS
CIGAR BOX

Follow these drawings to wire up the galvanometer. The unknown resistance attaches to the left binding posts, the battery to posts at right. Note wedges holding coil.



The wheatstone bridge assembled ready to determine unknown resistances. The three rheostat dials are adjusted in the determining process, the galvanometer telling the story.

A WHEATSTONE bridge is one of the standard pieces of electrical apparatus for laboratory use. While a manufactured bridge of extreme sensitivity is somewhat cosily, the electrical and radio experimenter can construct his own at very small cost.

This one will do very nicely to measure unknown resistances, find unknown condenser capacities and also inductance values. The one shown will handle up to 1000 ohms as unknown resistance but by substituting larger known resistances, the value of the bridge can be raised much higher.

You will need a good sized, flat cigar box, three ten ohm rheostats with knobs, switch, four binding posts, small compass, section of mailing tube and some wire and scrap metal.

First place the rheostats in the box lid with the knobs projecting through on the top side and near the front edge. From left to right letter them A, B and C. Then calibrate them by closing all three up so no resistance is included. Draw an arc around the knob and divide it into ten equal divisions of one ohm each.

Then divide each ohm into ten subdivisions of one-tenth ohm each. This will give you 100 points under each knob for accurate readings. A paper scale can be drawn and pasted under each knob or the scale can be inked directly on the lid itself.

The galvanometer is easily made. Cut off a section of 3-inch mailing tube about 1½ inches wide and wind on about 30 turns of No. 28 or No. 30 DCC wire as shown in the top drawing. "Sew" the ends of the turns into the cardboard of the tube after pulling the windings tight and then cover the latter with a coat or two of shellac to bind them. Place the coil on the lid back of rheostat B fastening it with a couple of little bolts through the lid.

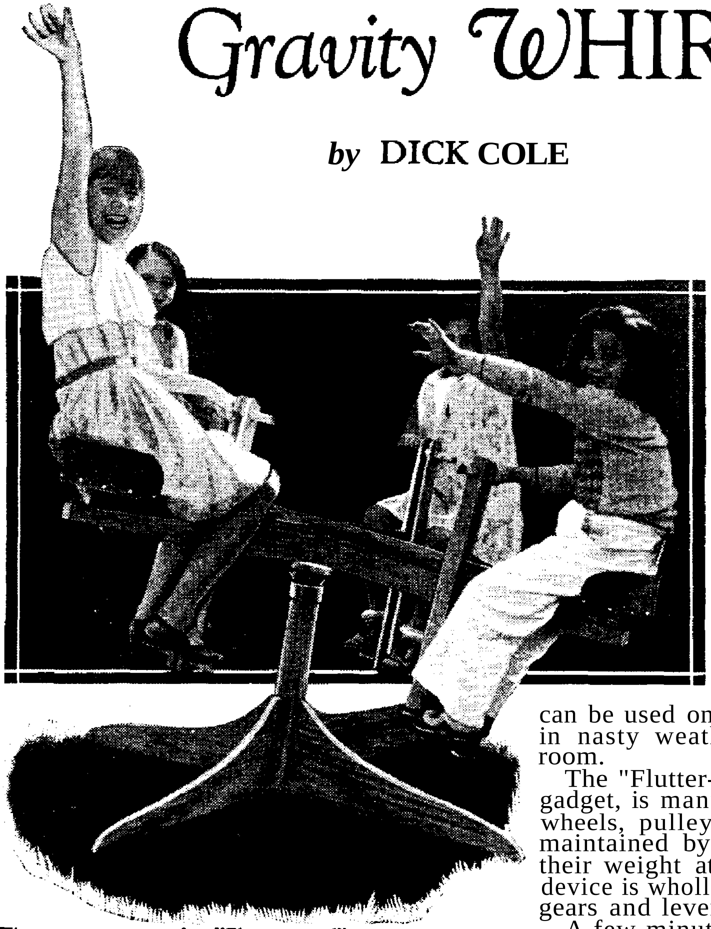
Then solder the base of the compass to a piece of stiff brass about ½ inch wide and bent in the form shown in detail to act as a support. Fasten this support to the lid at right angles to the coil and so the compass sits about in the center of the coil. The details of the galvanometer and its finished appearance are clearly shown in the sketch.

(Continued on page 142)

Gravity WHIRLS This

by **DICK COLE**

Manipulating gravity whirls you 'round and 'round on this fascinating playground device.



The popularity of the "Flutter-round" is attested by the expressions of delight on these youngsters' faces. After little practice it's easy to swing 'round and 'round at high speed.

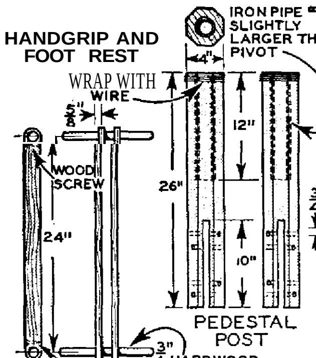
UNDOUBTEDLY the merry-go-round is the most popular attraction for youngsters at any amusement park. Other more or less sensational amusement devices ride the wave of popularity for a while and then fade away. But the merry-go-round goes merrily around forever.

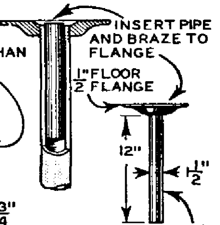
Herewith is a variation of the conventional merry-go-round which can be built cheaply by any man handy with a few tools. It can easily be dismantled and moved from place to place. In fair weather it can be used on the lawn or in the garden; in nasty weather, in the garage or play room.

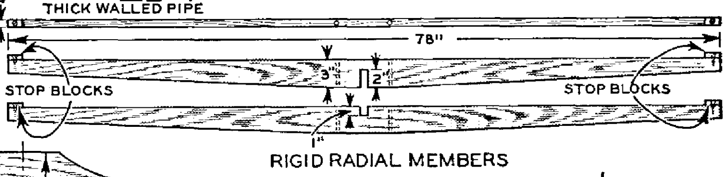
The "Flutter-round", as we shall call this gadget, is manually operated, but not with wheels, pulleys or gears. The rotation is maintained by the riders slightly shifting their weight at the right moment and the device is wholly free of any finger-pinching gears and levers.

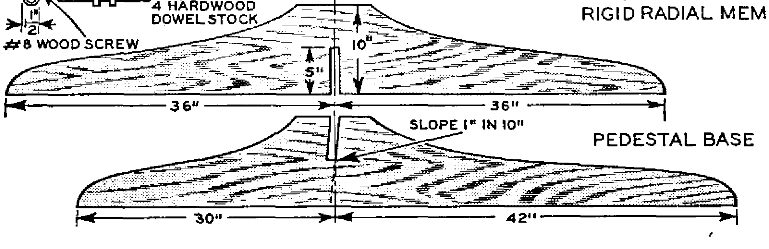
A few minutes' study of the accompanying drawings and photographs will reveal how the "Flutter-round" operates. It will be seen that the seats are attached to two radial cross pieces which are free to slide on two other radial cross pieces which are rigid to the vertical axle.

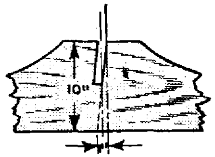
The axle turns within the pedestal post which is tilted about seven and one half degrees. Thus the radial pieces rotate in a slightly inclined plane, instead of in a horizontal plane, as in the case of the conventional merry-go-round.


HANDGRIP AND FOOT REST
WRAP WITH WIRE
5/8"
WOOD SCREW
24"
4"
26"
12"
10"
PEDESTAL POST


IRON PIPE SLIGHTLY LARGER THAN PIVOT
INSERT PIPE AND BRAZE TO FLANGE
1/2" FLOOR FLANGE
12"
1/2"
THICK WALLED PIPE


3/4"
78"
3"
2"
STOP BLOCKS
STOP BLOCKS
1"
RIGID RADIAL MEMBERS


3/4" HARDWOOD DOWEL STOCK
1/2"
#8 WOOD SCREW
10"
5"
36"
36"
SLOPE 1" IN 10"
PEDESTAL BASE
30"
42"



Dimensions for main parts may be seen above. Sloping cut in pedestal base gives the pedestal a seven and half degree tilt.

Fascinating "Flutter-round"

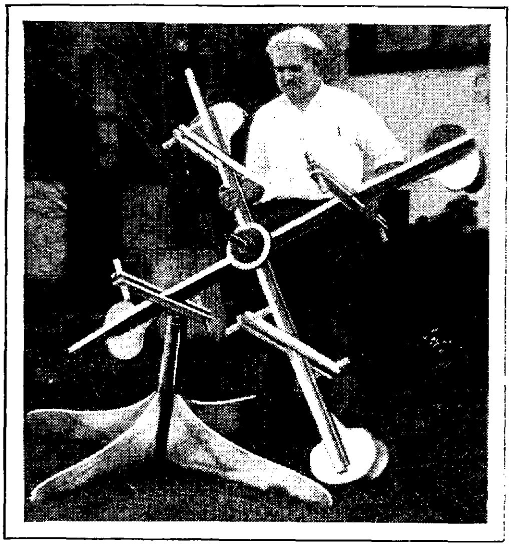
What makes it go 'round and 'round? The operating system can be readily understood. When a rider reaches the highest point of the inclined plane, he pushes his seat—incidentally, his weight—farther back from the center pedestal. At the same time, the rider at the lowest point pulls his weight forward with the handholds. Thus the center of gravity is elevated above the center of oscillation.

The rider at the top point swings around to the bottom. Each rider repeats the movement at the top and bottom of the plane Very soon the youngsters acquire the knack of synchronizing their movements to the rotation, and very little manual effort is required to keep the "Flutter-round" going 'round and 'round.

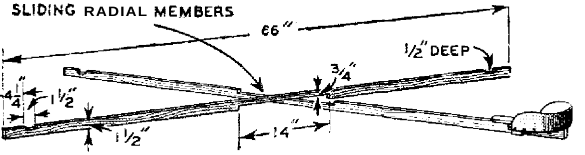
The drawings show plans, elevations and perspectives of all the parts entering into the construction, and but few explanations need be added. It is best to make this device of hardwood—oak or maple—but good, clear white pine will serve for all parts except the rigid cross pieces. These must be of selected hardwood to provide the necessary strength.

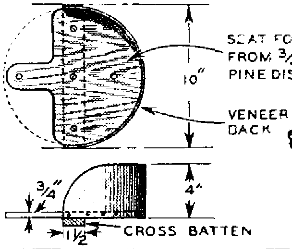
The pedestal post is shown octagon in shape. To prevent the post from splitting it is well to drive a collar of steel tubing over the end. In lieu of this, the end can be closely wrapped with galvanized wire and soldered.

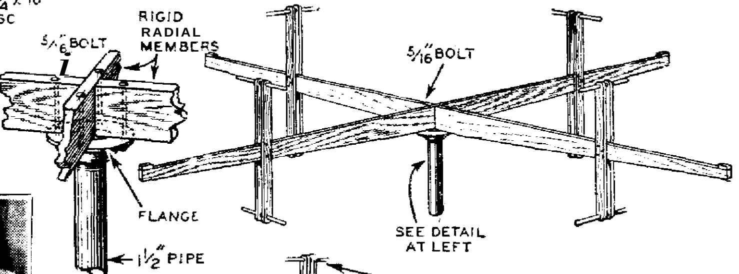
(Continued on page 136)

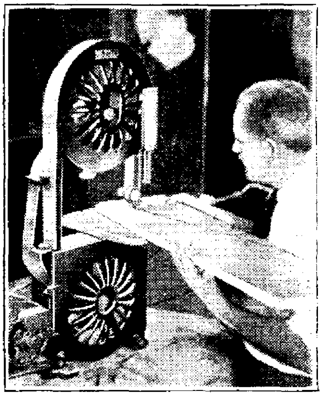


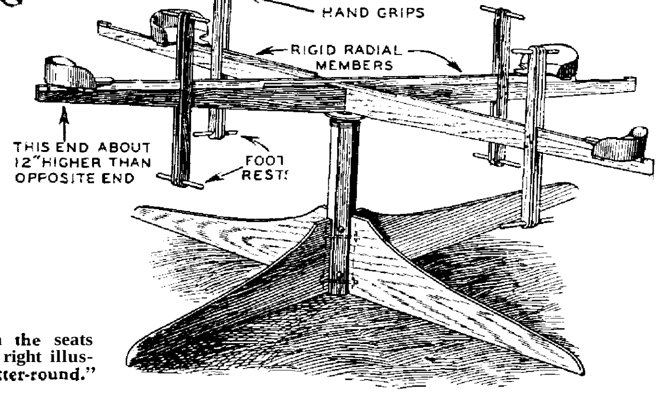
Here's the designer of the "Flutter-round" assembling his invention. Pipe on the flange fits into the pipe set into the pedestal. Note the tilt of this upright part. The device may be disassembled and set up indoors in bad weather.


SLIDING RADIAL MEMBERS
66"
½" DEEP
¾"
4"
¼"
1½"
1½"
14"


SEAT FORMED FROM ¾"X 10" PINE DISC
10"
VENEER BACK
¾"
4"
1½"
CROSS BATTEN


5/16" BOLT
RIGID RADIAL MEMBERS
5/16" BOLT
FLANGE
1½" PIPE
SEE DETAIL AT LEFT

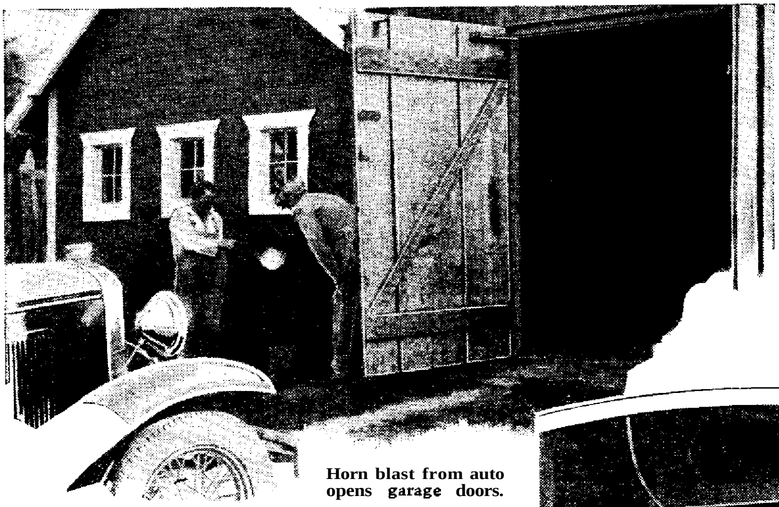



HAND GRIPS
RIGID RADIAL MEMBERS
THIS END ABOUT 12" HIGHER THAN OPPOSITE END
FOOT RESTS

Two pieces which form pedestal base and the seats can be cut out on a band saw. Drawings at right illustrate proper assembly of parts for the "Flutter-round."

Electric "MYSTERIES" Run

Imagine a gate that opens before your car at a touch of a button on the instrument panel —garage doors that swing open to a blast of the horn! These are features of the "House of Magic" on a poultry farm.



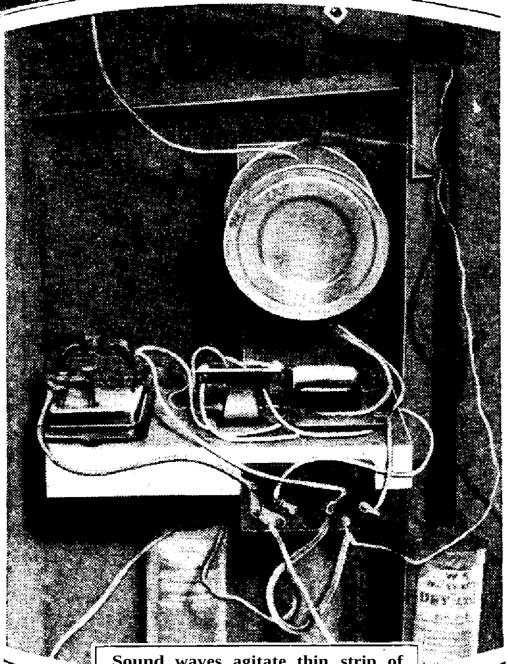
Horn blast from auto opens garage doors.

"THE House of Magic," is what the neighbors of William Udd, poultry farmer at Issaquah, Washington, call the comfortable home where he has put a number of electrical novelties to work for him.

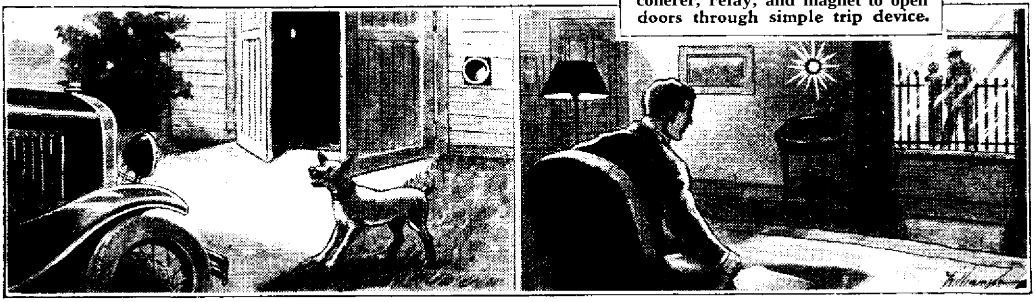
When Udd drives up to his garage, he is welcomed by a bark of greeting from his dog. Sound waves from the dog's bark actuate an electrical device which causes the garage doors to open and the lights to be turned on. Udd has fashioned a humidity meter from an alarm clock which keeps his chickens indoors if it is raining. When moisture in the atmosphere goes above a certain point, current is automatically switched on and the henhouse doors closed.

If an armed man should enter the gate of the Udd home, the household would be apprised instantly of its danger. Sensitive vacuum tubes at the gate would be affected by the metal of the gun and a red light inside the house would flash a warning.

When Udd approaches the closed gate of his home in his car, he presses a little but-

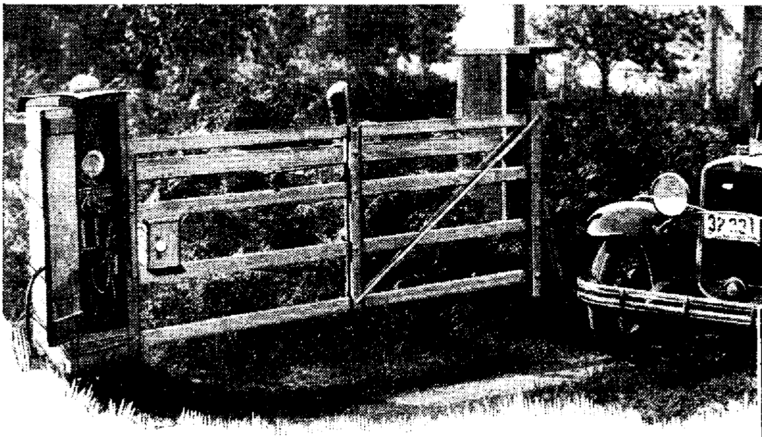


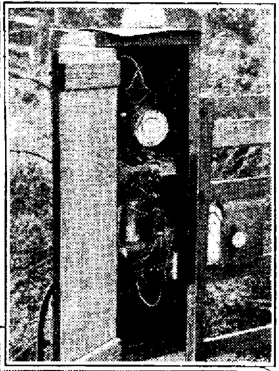
Sound waves agitate thin strip of metal which sends current through coherer, relay, and magnet to open doors through simple trip device.



It seems like black magic to auto passengers when garage doors swing open in response to the welcoming bark of the family dog. At right, a red light flashes inside the house when an intruder, armed with revolver or other metal weapon, passes the "detective" gate. Arrival of ordinary visitors is announced by the flashing of a green electric bulb inside house.

This HOUSE of MAGIC





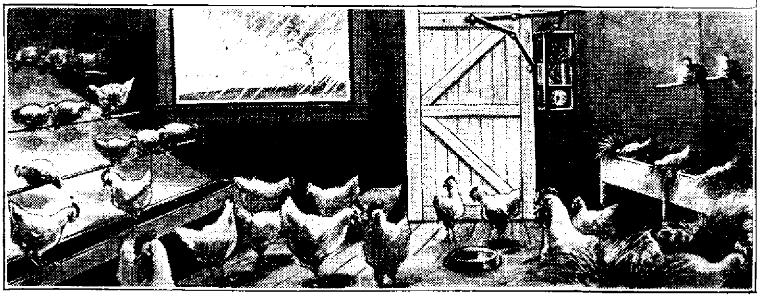
Entrance gate to the "House of Magic." When a button is pressed on instrument panel of car, the impulse is picked up by mechanism inside pillar (shown close up at the right) and the gate is swung open automatically.

ton on the instrument panel. Presto! Silently, the gate swings open to admit the automobile. The secret lies within a wooden pillar of the gate, shown in the photographs, which contains an automobile battery, dry cells, and other necessary equipment.

Pressing the button on the instrument panel sends an electrical impulse through the ether, picked up by antennae at the top of the pillars. This operates a coherer, providing a path for battery current which is carried to a sensitive relay, closing a switch which operates an electromagnet that pulls open the release catch of the gate.

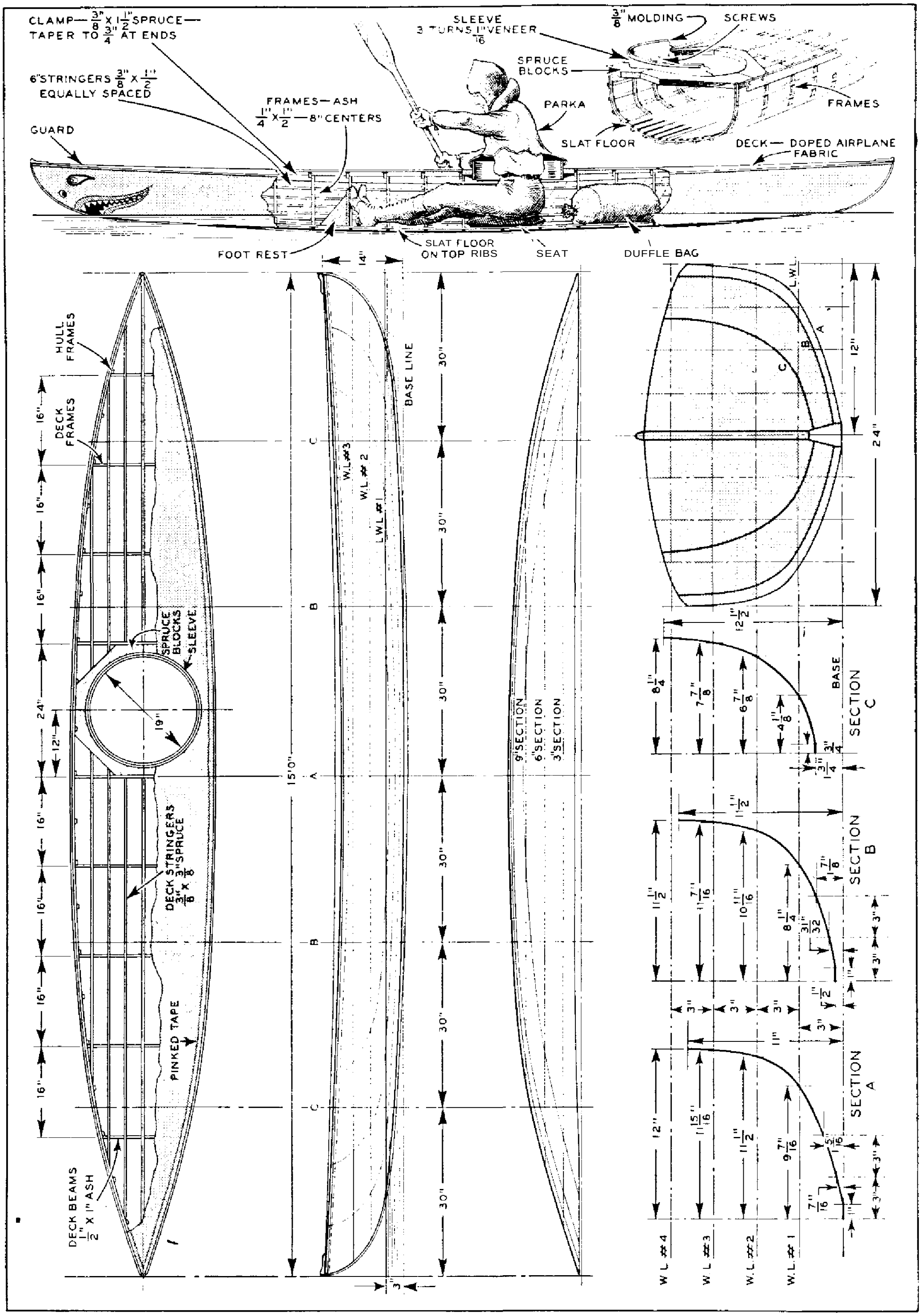
Udd also has a telephone mouthpiece, with a short dangling wire attached, into which you can speak and hear your voice boom out from a loudspeaker clear across the room. Then there is another stunt in which a variable condenser is placed around the subject's forearm. Two fine wires lead to the loudspeaker, with an oscillator and three-stage amplifier intervening in the wires* path. The condenser changes capacity in response to rhythm of the heartbeats; and the impulses are carried to the loudspeaker, throbbing out to fill the room with sound.

Voice issues from loudspeaker without hookup.



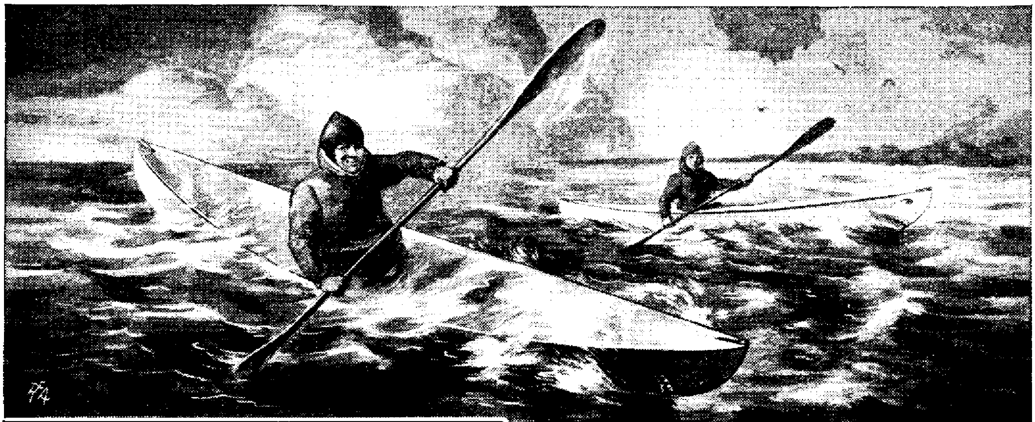
Chickens don't have to know enough to come in out of the rain on Mr. Udd's farm. A humidity meter automatically closes door of henhouse when moisture in air indicates a storm. Right above, woman listening to her own heartbeats, electrically amplified to such degree that the sound fills an entire room. A variable condenser is plac d around forearm.

Kyack Lines and Profile **Show** Interesting Details of Form and Parka

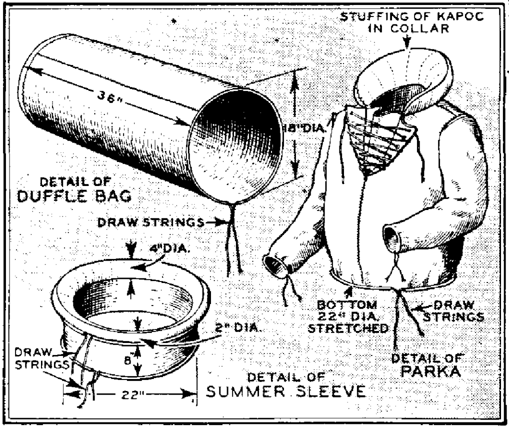

CLAMP—3/8" x 1 1/2" SPRUCE—
TAPER TO 3/4" AT ENDS
6" STRINGERS 3/8" x 1/2"
EQUALLY SPACED
GUARD
FRAMES—ASH
1/4" x 1/2"—8" CENTERS
SLEEVE
3 TURNS 1/16" VENEER
SPRUCE
BLOCKS
PARKA
3/8" MOLDING
SCREWS
FRAMES
SLAT FLOOR
DECK— DOPED AIRPLANE
FABRIC
FOOT REST
SLAT FLOOR
ON TOP RIBS
SEAT
DUFFLE BAG
HULL
FRAMES
DECK
FRAMES
SPRUCE
BLOCKS
SLEEVE
19"
DECK STRINGERS
3/8" x 3/8" SPRUCE
PINKED TAPE
DECK BEAMS
1/2" x 1" ASH
16"
24"
12"
14"
BASE LINE
W.L.#3
W.L.#2
L.W.L.#1
15'0"
30"
3"
9" SECTION
6" SECTION
3" SECTION
C
B
A
L.W.L.
24"
12 1/2"
SECTION
C
SECTION
B
SECTION
A
BASE
W.L.#4
W.L.#3
W.L.#2
W.L.#1

A kyack, as will be noted, is double ended in the true sense: both ends are exactly alike. Note detail of parka molding. Cheesecloth and paper laid in varnish do the trick. The foot rest is made of a board of ¾″ stock braced by an angle. This will allow you something to root against when paddling. The molding will take a summer sleeve for warm days. The lines are shown as they will look when you have made them full size from the mold section dimensions.

How to Build a KYACK



The kyack is a highly developed form of boat, and will outlive most any boat in rough water. A logical development by the Esquimau, they are fine for paddling.



This is the parka which keeps out the water, and makes the boat almost as though it were a part of the user's body. Duffle bag and summer sleeve are added adjuncts.

by SAM RABL

SPRING time and reminiscences—dreams of years ago and of how as a pair of high school kids we built our first boat. No glorious Spanish argosy looked half so wonderful to our eyes as did that little hooker built over a frame of barrel hoops and strips of cull lumber secured from a nearby box factory.

The covering was the unique part of the job. Somewhere we had seen the plans of a boat built from paper and as we could not afford canvas to cover our frame, we covered it with many layers of newspaper. Each layer was pasted to the one beneath it with a mixture of tar filched from a nearby tar barrel and rosin secured from the scrapings of whisky barrels stored behind a neighboring distillery. With fingers blistered from the molten mixture we proudly launched our creation and much to the surprise of bystanders and ourselves it floated.

We used this craft for two seasons. Our next creation was a pair of twin kyacks, this time covered with brown wrapping paper, each layer set down with varnish. A canvas deck kept out the water and for five years we cruised these little hookers into the far reaches of our beloved home waters in Chesapeake Bay.

Now the white man copied the graceful Indian canoe as a craft of pleasure and utility. Over the crude construction of the red man he molded the modern creations that now flock over our streams to carry Johnnie and Tillie to their favorite berth beneath the shadow of the willows.

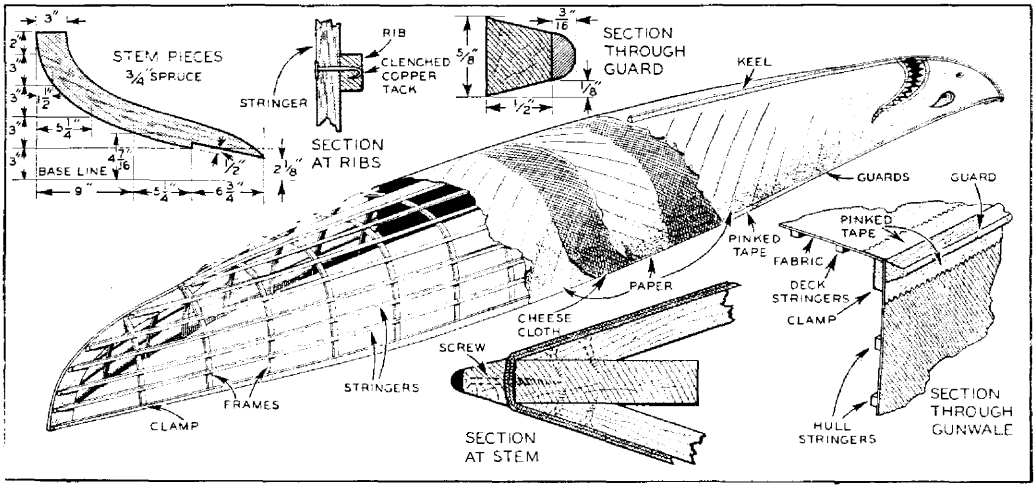
Ideal for Rough Water

Up in the Arctic, a cousin to our red men. little Willie Eskimo, did most of his canoeing on open water, to wage his ever enduring war for food which comes to him only by the way of the sea, and a turbulent sea at that. He invented the kyack and today the white man who must do his canoeing on white water copies the little skin covered boat with the same improvements that he has put in the Indian canoe. The kyack will go anywhere a canoe will go and besides this it will ride out waves that would sink a canoe, and for that matter many a larger vessel.

To those to whom a canoe only means a party on the quiet waters of an inland stream the little boat described in this article will have no appeal, but to the man who likes his cruising on rough water and does not want to wait for his weather the kyack will find its greatest appeal.

We have learned a lot since the days of our first kyack and many new materials have appeared on the market that now make

Framing and Tough Covering Shown in Dimensional Skeleton Details



Here are the dimensions for the stem. The way the hull is covered with successive layers of paper is also shown.

possible a craft in which every fault that our first kyacks possessed is licked to a frazzle.

Casein glue and airplane fabric have contributed to the wonderful strides made in the construction. We were called upon some time ago to design some ultra light floats for a glider and we naturally turned to our light paper experience in producing these floats. We improved the slow process of varnish adhesive with the use of casein glue and further aided the puncture proof qualities of brown paper with two layers of cheesecloth. While the framework of our floats failed under landing impact the paper covering remained intact, even resisting the sharp edges of splintered framework. As a test of the waterproofing we allowed the floats to remain afloat for a week and noticed no harmful effect.

Putting Her Together

To begin the construction of the kyack a piece of 2x6 inch pine is secured and shaped as shown on the detail sheet for the keel horse. Five molds are made from any rough lumber available to the shape shown on the plans. A piece of spruce ½"x2" is laid on top the horse after tapering the ends down to a ¾" width and the molds are slipped over top of this piece. The stem pieces are erected at the ends of the keel and spruce strips of ⅜"x½" are equally spaced around the molds below a clamp of ⅜"x1½"spruce whose ends are tapered down to a width of ¾". After the longitudinal frames are in place the transverse frames or ribs are bent inside the stringers and fastened to them with a one-inch copper tack at each intersection. The ash ribs are made pliable by soaking for several hours in hot water and it might be well to clamp a band of thin metal between the sheer chimps clear around the null to prevent its spreading and bulging when the ribs are forced down in place. Be sure and drill for every fastening and drive the tack from the outside against an old flatiron or a large diameter iron bar to clench it. The framework should be given a coal of thin shellac before the covering is applied.

Wrapping Paper Covering

A roll of brown wrapping paper is next sawed into lengths about five inches wide and wrapped diagonally around the hull starting at the center and working toward the ends. The stringers are covered with casein glue at the points of contact. Be sure that the lap of the paper is a half inch at the keel. The laps at the gunwales will be somewhat greater than this due to the shape of the hull. The paper should be moistened with a damp (not wet) sponge before application and when dry will get a drum-like tightness. Over the paper a layer of cheesecloth is applied and the next layer of paper is run diagonally opposite.

The cheesecloth should not be glued to the first layer of paper as the glue is spread under each strip of paper of the second layer as it is applied. After the second layer of paper is applied it is allowed to dry and it is then given a light coat of airplane dope or clear lacquer to waterproof it as no varnish will soak in this far. The second layer of cheesecloth and the third layer of paper are applied in a like manner with the exception that no lacquer is used. The deck beams and stringers should be

(Continued on page 144)

KYACK BLUEPRINTS

For Rabl's Kyack Design

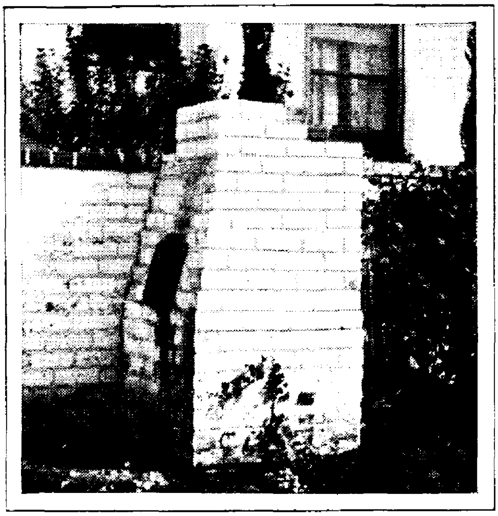
Blueprints for the little boat shown in this article can be had at the home office of the magazine for the sum of $1.00. While they are no more complete than the plans offered here, they are larger and they are much clearer than it is possible to show on a page this size, hence they are easier to work from. Made directly from artist's originals. Send $1.00 to Blueprint Department, Modern *Mechanix* and Inventions. 529 South Seventh St., Minneapolis, Minn.

Home Incinerator Built Into Brick Wall Is Inconspicuous

INCINERATORS in town and city are necessary evils, but here is one that minimizes the evil in a most original way. It can be built as part of a five-foot brick wall surrounding your back yard, appearing merely as an extension of the wall inward. On the side inward from the street is the metal door where the trash enters the box-like interior, and at the bottom on this same side is the opening through which ashes are removed.

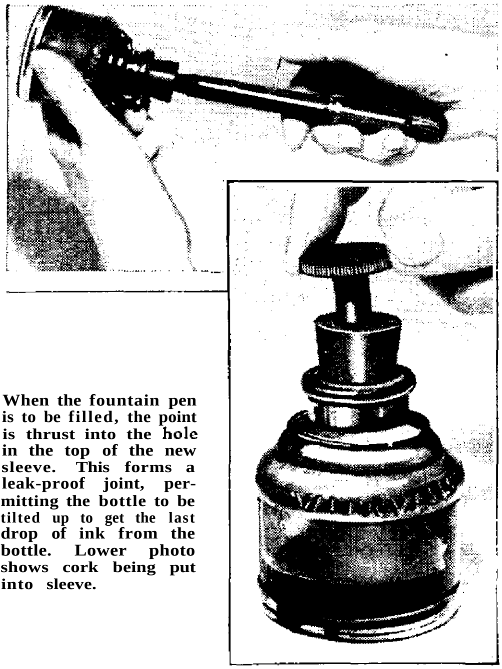
This placing of the incinerator is not objectionable to anyone when in use and scarcely to be noted when no smoke issues from its top. Ivy may be planted at its base, as along the whole wall. This will screen it entirely.

Built as a part of the wall the incinerator calls for little extra work and but few more brick, thus costing considerably less than a separate incinerator.



The incinerator is built as part of the brick wall as illustrated here. The cost of construction is negligible.

Pen Filling Easy With New Cork



When the fountain pen is to be filled, the point is thrust into the hole in the top of the new sleeve. This forms a leak-proof joint, permitting the bottle to be tilted up to get the last drop of ink from the bottle. Lower photo shows cork being put into sleeve.

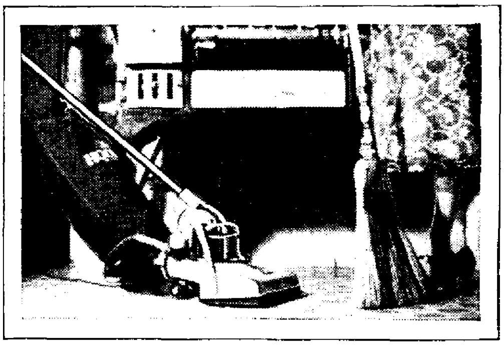
FILLING a fountain pen from an ordinary ink bottle is a tough job, unless you utilize a new special cork for the job which has just been patented. Shown above, the cork fits into the neck of the bottle, and has a hole in the top into which the point of the fountain pen is thrust, forming a leak-proof joint and permitting the bottle to be upended. When the filling job is completed, the top cork is replaced closing the top tightly. Use of the cork avoids all messiness and permits you to drain the ink to the last drop.

Vanadium Found in Sea Squirts

A REMARKABLE chemical difference between the blood of the lowly seashore animals called sea squirts and other animal groups has been discovered by a distinguished Roumanian biologist. Instead of the iron found in the blood of higher animals the scientist finds the blood of the sea squirts to contain the rare metal called vanadium, now used industrially to make certain kinds of steel.

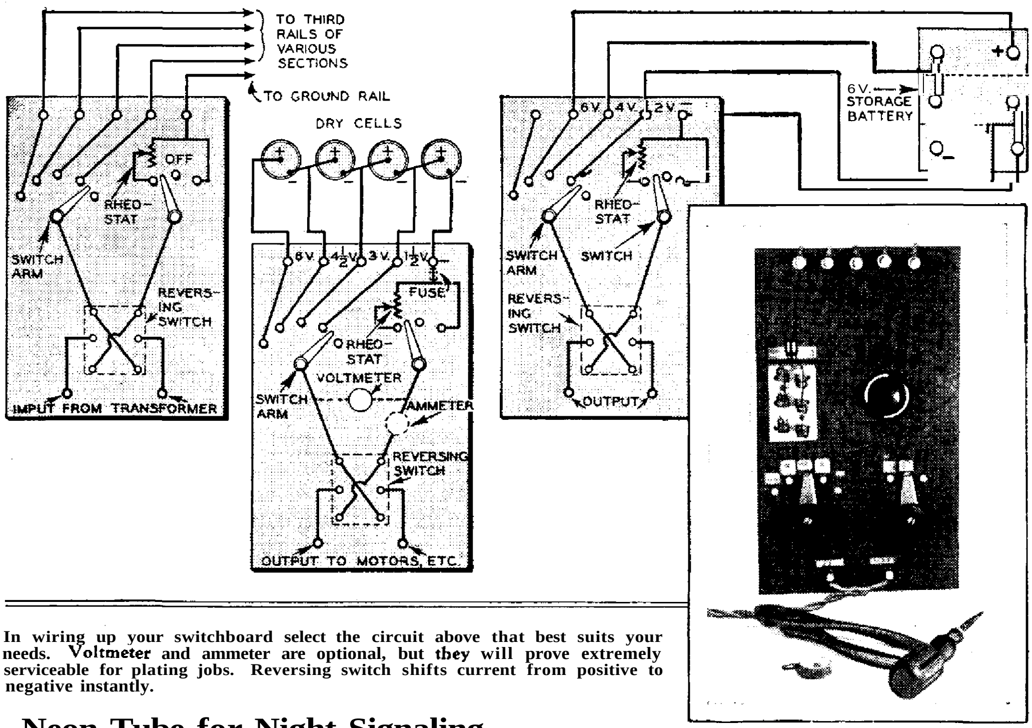
Vacuum Sweeper Acts as Dust Pan

IN THE kitchen or any room where rugs are not used, the cleaner may be put to convenient use in lieu of the conventional dust pan. Place the cleaner in the center of the room, start the motor and proceed to sweep the floor in the usual manner. Instead of sweeping the dirt into a small pile, to be picked up later with the dust pan, merely direct it toward the cleaner, which will dispose of it instantly and efficiently.



Dust from linoleum is swept up close to the nozzle of the sweeper which then does duty as labor-saving dust pan.

A Time Saving Switchboard for Amateur Electricians


TO THIRD RAILS OF VARIOUS SECTIONS
TO GROUND RAIL
OFF
RHEO-STAT
SWITCH ARM
REVERS-ING SWITCH
INPUT FROM TRANSFORMER
DRY CELLS
6V. 4½V. 3V. 1½V.
FUSE
RHEO-STAT
VOLTMETER
SWITCH ARM
AMMETER
REVERSING SWITCH
OUTPUT TO MOTORS, ETC.
6V. 4V. 2V.
6V. STORAGE BATTERY
RHEO-STAT
SWITCH ARM
SWITCH
REVERS-ING SWITCH
OUTPUT

In wiring up your switchboard select the circuit above that best suits your needs. Voltmeter and ammeter are optional, but they will prove extremely serviceable for plating jobs. Reversing switch shifts current from positive to negative instantly.

ARE you one of the wire twisting fraternity who has grown tired of perpetually changing wires every time you decide to reverse the current or change the voltage to one of your pet motors or generators? If you've wanted a switchboard to do the work here's the answer to your prayers.

This switchboard will work fine with a storage battery, dry cells, or a toy transformer. It will allow you to change the voltage in several steps, reverse the current, switch it off, use the rheostat to dim the lights, or switch the current to different circuits. The apparatus will carry in excess of 500 watts.

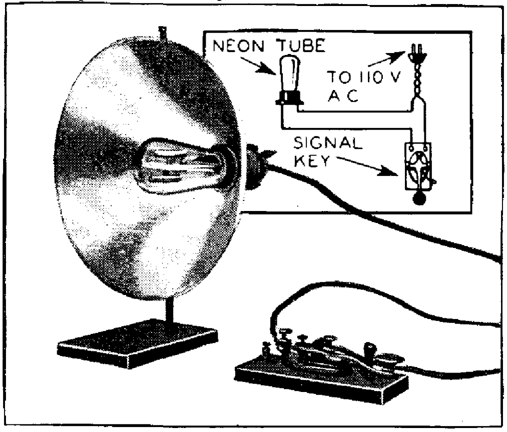
An old radio panel may be put into service, and if you like an ammeter and voltmeter may be added for use in electroplating and other experiments. For safety's sake a tubular fuse of the automotive variety may be added to prevent overloads.

Mount all the switcharms, switchpoints, and other equipment as suits your convenience. Then wire the board according to the accompanying diagrams. Twisted lamp cord will easily handle the current.

The panel may be used to deliver different voltages, or it may be used to switch the current to the various isolated blocks of a model railway system. In order to reverse the current it is only necessary to reverse the current from the top to the bottom pole.

Neon Tube for Night Signaling

BOY Scouts who like to do night signaling will find good use for this little neon blinker set. First you'll have to procure a neon tube and a key. Mount the tube in a reflector as illustrated at the right and hook up the key as in the drawing. Plug the light in a 110 volt outlet and bang away at the key. One advantage of the tube is that the flash is instantaneous. The light comes to full glow instantaneously and shuts off instantly, making for unusual distinction in night signaling. For a key, any old telegraph signaling key will do duty excellently.


NEON TUBE
TO 110 V A C
SIGNAL KEY

Mount neon tube in *a* reflector as illustrated in photo. Tube is hooked in series with key and **110-volt** bayonet plug.

Bumper Trunk Carries Extra Gear on Your Camping Trip

MECHANICALLY-INCLINED motorists can solve the problem of overcrowded cars on the long trips by constructing inexpensive "trunks" for carrying extra food, clothing or camping equipment.

The space between the lower part of your radiator and the rear of your front bumper can be utilized as a bumper "trunk" for transporting ice, food or clothing.

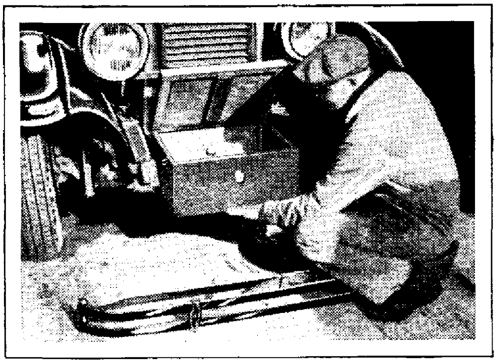
Lay out the two sides and bottom of the box on a piece of No. 14 sheet iron, 40½ in. long and 14 in. wide. Then drill six ¼ in. drain holes as shown, and bend sheet on dotted lines. These dimensions are shown in the drawing at the right.

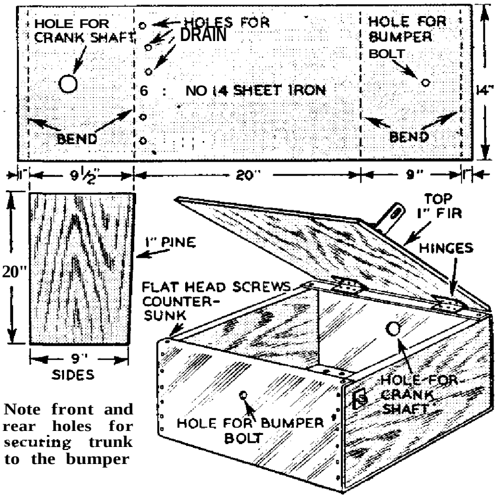
In laying out the sheet, note that the rear of the box is supported by the protruding crank shaft protector, while the front is fastened to the center bolt of the front bumper.

The wooden ends are constructed as shown, 20 in. long by 9 and 9½ in. wide. The ½ in. difference is necessary so that the box will slope back and drain itself when used as an ice carrier. The top is built of heavy fir, 14 in. by 20 in., and is hinged to the rear wall. Flat-head screws, 1½ in. long, are used to fasten the wooden ends to the sheet metal sides.

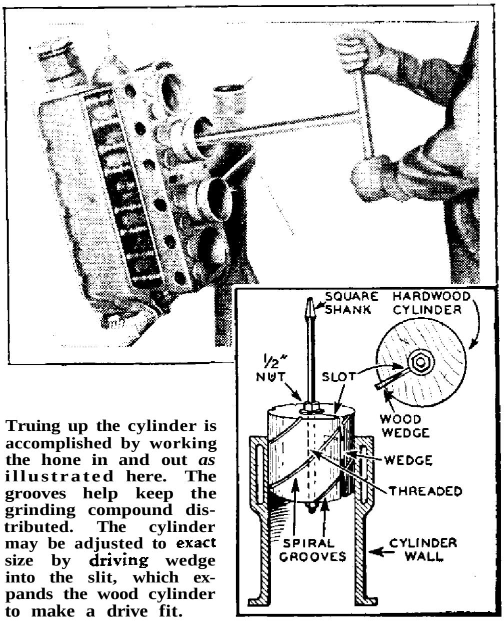
A lining of cork linoleum insulates the contents of the box from the heat of the radiator, and will protect ice-packed fish, game or other perishables in any climate.

These metal "trunks" can be constructed for slightly more than the cost of the sheet iron used." They will protect your equipment, improve the appearance of your car, and make for greater riding comfort and enjoyment.





Note front and rear holes for securing trunk to the bumper



Truing up the cylinder is accomplished by working the hone in and out as illustrated here. The grooves help keep the grinding compound distributed. The cylinder may be adjusted to exact size by driving wedge into the slit, which expands the wood cylinder to make a drive fit.

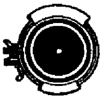
For the Home Auto Mechanic

WHILE the process of lapping cylinders has long since become obsolete for garage practice, there are many home shop owners who must improvise some way of truing up cylinders. In this case the best practice to follow when removing score marks is to devise a hardwood block as illustrated herewith. Throw a hardwood block slightly larger than the diameter of the cylinder to be honed and just as long, into the lathe and turn it down until it is just the size of the bore of the cylinder. Then bore a half inch hole through the block from end to end. Next proceed to prepare a shank as illustrated in the drawing. Use a round file to cut spiral grooves.

In use the oil or emery for the grinding compound is evenly distributed over the block and the grooves will help keep it distributed.

A simple method of expanding the wood block is made use of as illustrated. A saw slot is run into one side of the wood block to the center hole. By driving the wood wedge inward it will be found an easy matter to expand the block till it is precisely the right size to fit the cylinder.

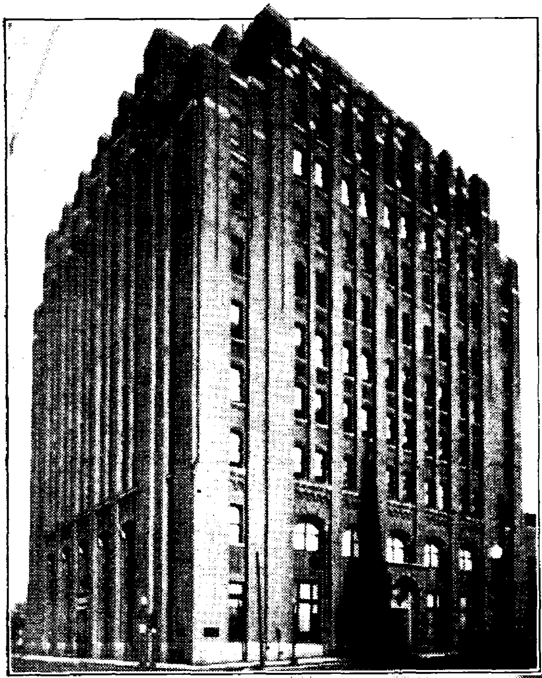
PICTURE



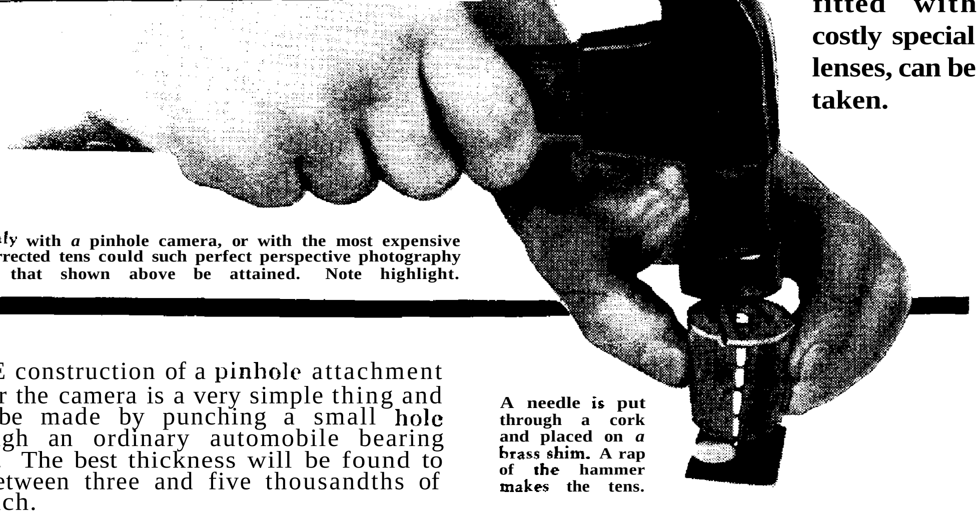
by

BRUCE SIFFORD

The construction of a pinhole lens for a camera is very simple and can be accomplished by punching a small hole through an ordinary brass automobile shim. Photos of extreme wide angle, impossible with other cameras except when fitted with costly special lenses, can be taken.



Only with a pinhole camera, or with the most expensive corrected lens could such perfect perspective photography as that shown above be attained. Note highlight.



A needle is put through a cork and placed on a brass shim. A rap of the hammer makes the lens.

THE construction of a pinhole attachment for the camera is a very simple thing and can be made by punching a small hole through an ordinary automobile bearing shim. The best thickness will be found to be between three and five thousandths of an inch.

Making a photograph by substituting a small pinhole for the lens is one of the oldest yet most interesting phases of experimental photography. The pictorial possibilities of this type of lens have long been recognized. The soft image obtained, the pleasing halos around the highlight and the trueness of perspective are unequalled save with the most expensive equipment. Paradoxical, isn't it?

With the recent development of the supersensitive film, a fully timed negative can be made on a bright day with a single exposure from thirty to sixty seconds.

Unlike the ordinary camera lens which is in focus only at a specific distance from the film, the pinhole lens is always in focus no matter what distance it is placed from the ground glass. This property of the pinhole makes it possible to make photographs embracing an extremely wide angle by placing the pinhole within an inch or two of the film. Although there is a practical limit as to the angle covered by the pinhole lens, it is surprising just how much territory can be taken in. Buildings can be gotten in from a height of 200 feet while the camera is at the curb across the street!

A small sewing needle can be used to pierce the metal. However, the ordinary sewing needle is one millimeter in diameter which is much too large for a pinhole that will give sharp definition. Therefore some care must be made in piercing the shim so as not to get the hole too large. An easy method of getting the right hole is to push the needle through a bottle cork so that the point is just visible. With a sharp

MAKING through a Pinhole

pair of scissors snip off the end of the needle flush with the top of the cork. Thus with a gentle tap of the hammer the point on the other side will be made to just pierce the shim.

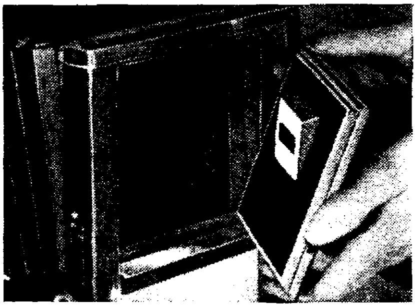
The shim is then placed on a razor hone or hard oilstone and ground down so that the edges around the hole are smooth. Then by using the needle in a hand drill the hole can be made perfectly round.

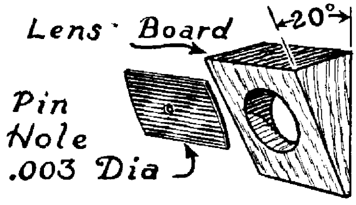
After a few turns of this drill the hone should be used again to keep the edges perfectly smooth. This process is repeated until a round hole with well defined edges is obtained.

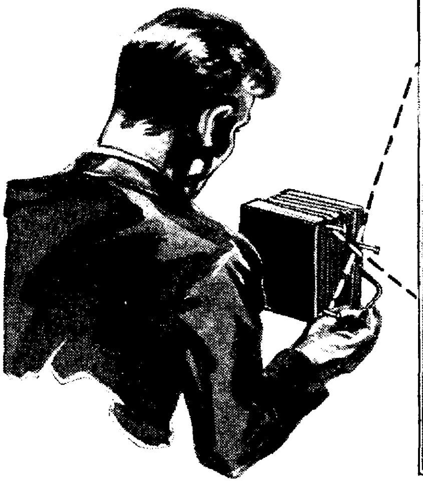
For ordinary pictorial pinhole photography the lens can be mounted right at the center of the lens board, the same as any lens. But for shooting tall buildings at close range a different method will have to be used.

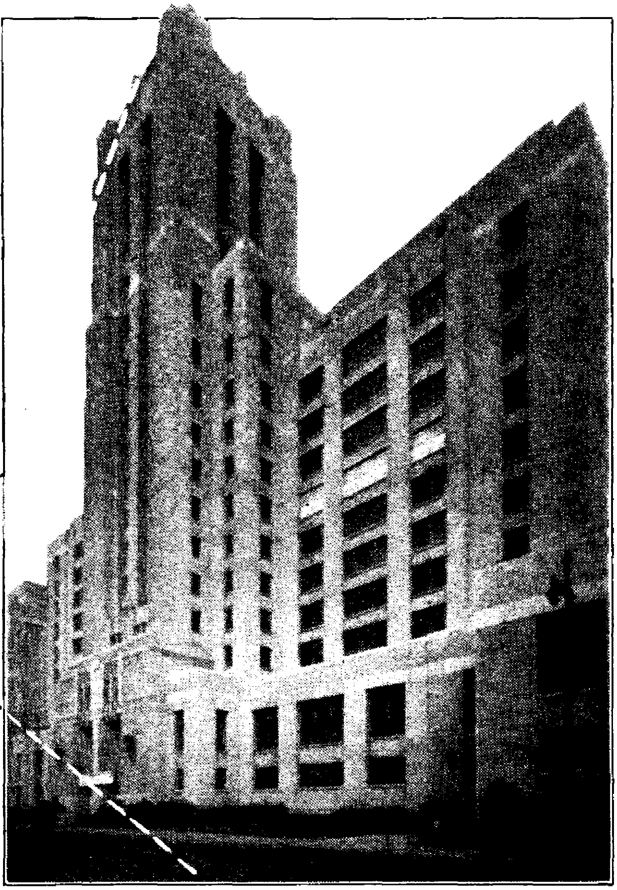
In this case it is advisable to mount the shim on an angle block placed at an angle of about 20 degrees to the lens board. This will take in more sky and less foreground. Also the negative will have more even illumination due to the fact that the rays of light passing through the pinhole in a straight line are stronger than those at a slant. This counteracts the unevenness of the light at the top and bottom of the building and makes very even lighting an automatic thing.

The pinhole shim can either be attached to the block with glue or with adhesive tape around the edges. Remember that the hole in the block should be better than a couple of inches in diameter, because the lens embraces such a wide angle that the edge of the big hole is apt to vignette the image!







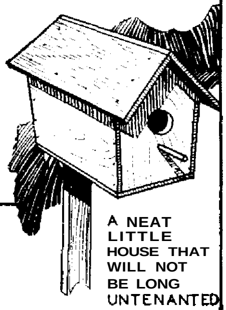


By mounting the lens close to the film and at an angle of about 20 degrees more sky and less foreground will be embraced on the image. By placing pins to correspond with lines of divergence of the lens, and by sighting along the lines as shown, one can tell exactly what view he is going to capture. Ground glass focusing screens can not be used.

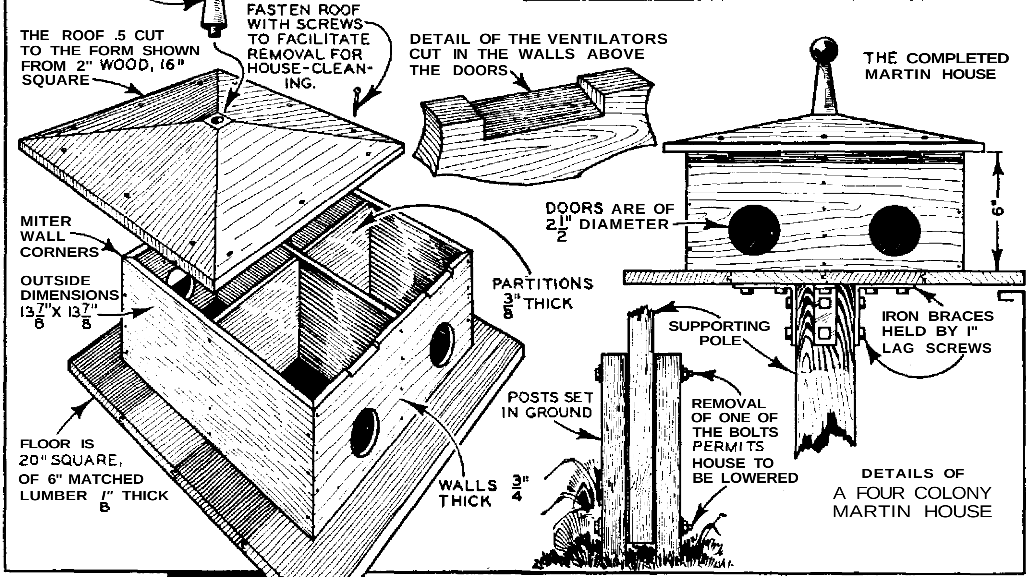
Build Bird Houses Now, Ready for Spring Songsters

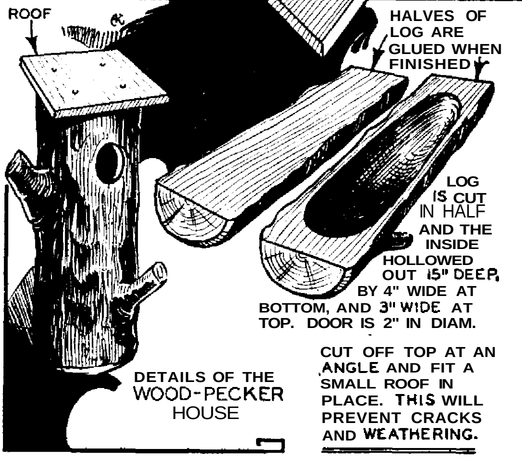
BIRDS will locate anywhere they are invited. This invitation need only be suitable quarters where they can build their nests, find plenty of food, raise their young, and receive kind treatment. Many of them will return year after year to the same nest and brighten your summer with their cheerful songs.

There's no trick in building any of the houses shown on these two pages. They can be made from broken wooden boxes, miscellaneous pieces of lumber and short pieces of limbs.



A NEAT LITTLE HOUSE THAT WILL NOT BE LONG UNTENANTED


WOODEN DALL
WOODEN SPINDLE
THE ROOF .5 CUT TO THE FORM SHOWN FROM 2" WOOD, 16" SQUARE
FASTEN ROOF WITH SCREWS TO FACILITATE REMOVAL FOR HOUSE-CLEANING.
DETAIL OF THE VENTILATORS CUT IN THE WALLS ABOVE THE DOORS
THE COMPLETED MARTIN HOUSE
MITER WALL CORNERS
OUTSIDE DIMENSIONS 13 7/8" X 13 7/8"
DOORS ARE OF 2 1/2" DIAMETER
6"
PARTITIONS 3/8" THICK
SUPPORTING POLE
IRON BRACES HELD BY 1" LAG SCREWS
POSTS SET IN GROUND
REMOVAL OF ONE OF THE BOLTS PERMITS HOUSE TO BE LOWERED
FLOOR IS 20" SQUARE, OF 6" MATCHED LUMBER 7/8" THICK
WALLS 3/4" THICK
DETAILS OF A FOUR COLONY MARTIN HOUSE


ROOF
HALVES OF LOG ARE GLUED WHEN FINISHED
LOG IS CUT IN HALF AND THE INSIDE HOLLOWED OUT 15" DEEP, BY 4" WIDE AT BOTTOM, AND 3" WIDE AT TOP. DOOR IS 2" IN DIAM.
CUT OFF TOP AT AN ANGLE AND FIT A SMALL ROOF IN PLACE. THIS WILL PREVENT CRACKS AND WEATHERING.
DETAILS OF THE WOOD-PECKER HOUSE

Martins prefer multiple dwellings set out in the open away from buildings and trees. The above diagram shows a 4-room house. On the left is a novel wood-pecker house.

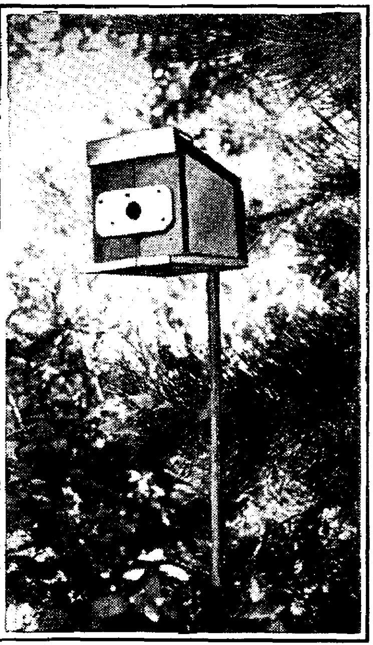
Since these houses can be made without detailed information, it will be well here to outline a few of the individual likes and dislikes of the various birds, so that in building their future homes you can make them to suit the expected occupants.

Houses should not be stained or painted on the inside because bright colors often frighten the birds. Any dull color can be used for the outside; gray and brown being favorites.

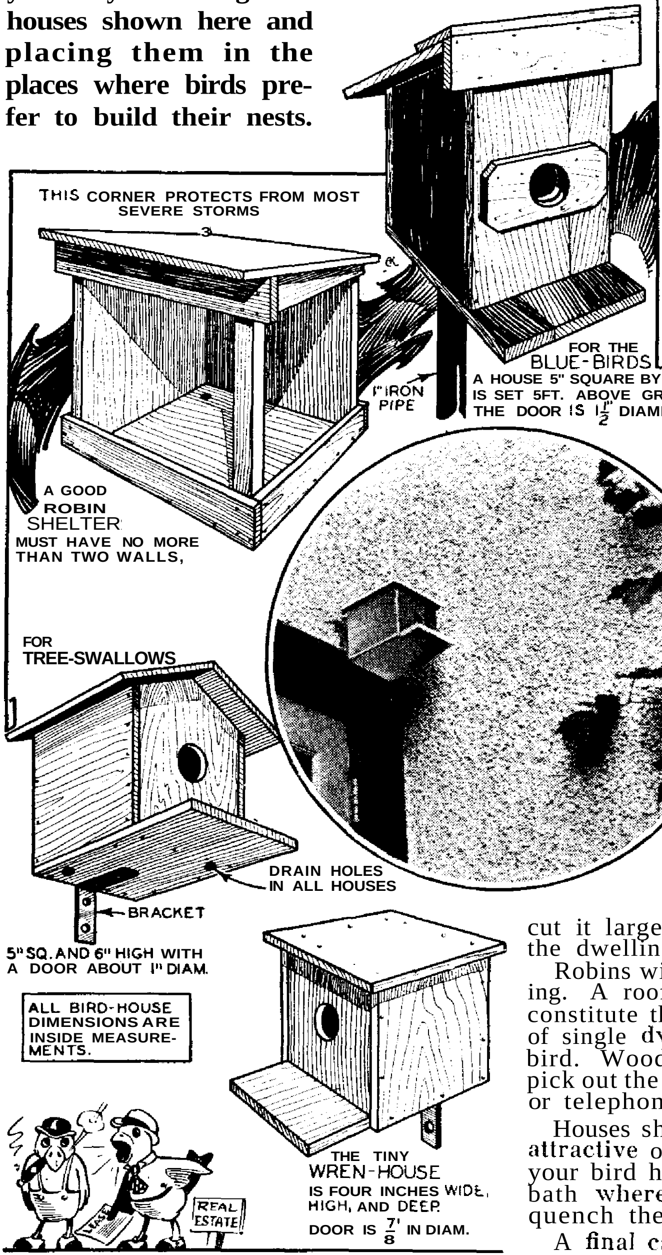
Martins are perhaps the best loved songsters. They will return summer after summer and prefer multiple dwellings, like the one shown on this page. In placing the house, put it in the open, on a supporting

Let's *Build a* BIRD HOUSE

Invite your favorite songsters to live in your yard by building the houses shown here and placing them in the places where birds prefer to build their nests.



The above blue-bird house is made from scrap pieces of lumber and set up off the ground about 5 feet on a wooden pole or metal pipe. Robins prefer the frame shelter shown on the left and will not nest in any house having more than two side *walls.* Set robin houses neat the ground.


THIS CORNER PROTECTS FROM MOST SEVERE STORMS
A GOOD ROBIN SHELTER MUST HAVE NO MORE THAN TWO WALLS,
1" IRON PIPE
FOR THE BLUE-BIRDS A HOUSE 5" SQUARE BY 8" HIGH IS SET 5FT. ABOVE GROUND. THE DOOR IS 1½" DIAMETER
FOR TREE-SWALLOWS
DRAIN HOLES IN ALL HOUSES
BRACKET
5" SQ. AND 6" HIGH WITH A DOOR ABOUT 1" DIAM.
ALL BIRD-HOUSE DIMENSIONS ARE INSIDE MEASUREMENTS.
THE TINY WREN-HOUSE IS FOUR INCHES WIDE, HIGH, AND DEEP. DOOR IS 7/8" IN DIAM.
REAL ESTATE

The secret of a successful wren house lies in making the door small enough so that sparrows won't drive the wrens away and take it over. Extended floor board serves as perch.

pole, away from buildings and trees.

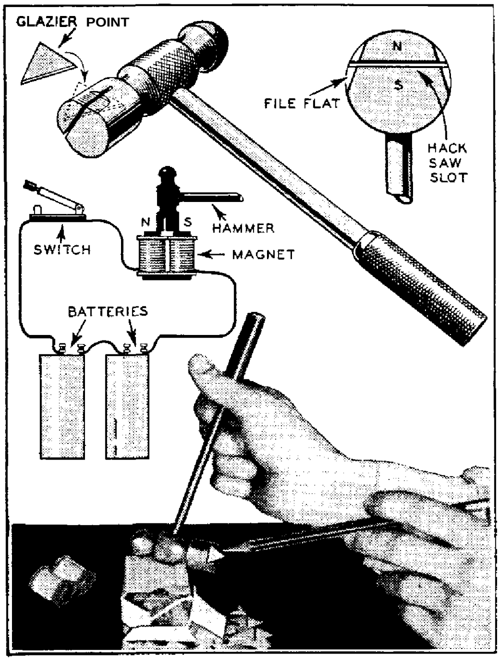
Wrens like to live close to the ground. For that reason you can put their houses over the kitchen door, under the eaves, or on lower branches. Set them high enough to be out of the way of cats and inquisitive children. Remember, the door is but % inch in diameter — if you cut it larger the sparrows will take over the dwellings.

Robins will not live in an enclosed dwelling. A roof, floor, and one or two walls constitute their new home. Most any type of single dwelling is suitable to the blue-bird. Woodpeckers and screech owls will pick out the home fastened high up on a tree or telephone pole.

Houses should not be grouped, but set in attractive out-of-the-way places. To make your bird haven complete, include a bird bath where they can always bathe and quench their thirst.

A final caution: Don't use tin or metal containers for bird houses. To do so may mean virtually roasting the young birds in their nests.

Magnetized Glazier's Hammer Makes Glass Setting Easy



Magnetism in head of hammer, induced by the horseshoe magnet, holds the glazier points in place for setting glass.

SETTING glass in a window frame can be a hopelessly awkward job unless you're wise to the tricks of the trade. Even then, however, it's not so easy, but there is something you can do to make the task less disagreeable.

Here's what to do: Lay hands on a ball-pein hammer and proceed to operate on it in the following manner. First cut a slot in the face of the head with a hack saw. The location of the cut should be about as illustrated in the accompanying drawing.

Your next task is to bring a file into action and file off a small portion of the side of the head, just beside the slots. This little notch is cut to take the glazier's points, which should abut against the bottom of the filed-out section.

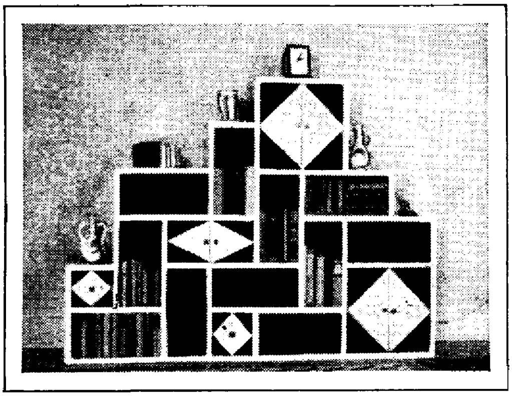
The hammer head should be magnetized to hold the glazier points when you are doing the pounding. This eliminates the necessity of holding the points in position with your fingers and thus risking a bruise.

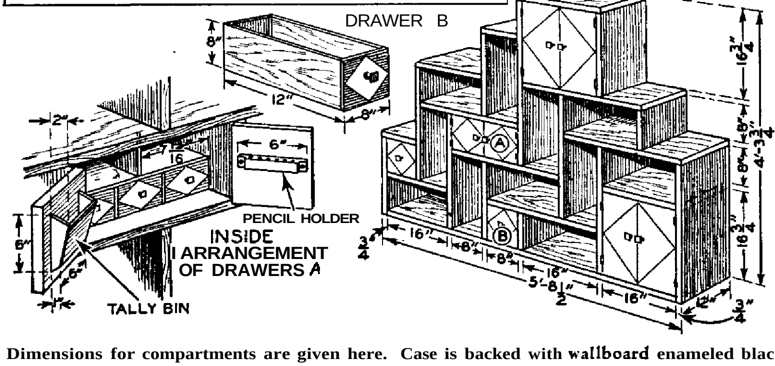
The magnetizing process is accomplished by holding the head over a magnet as demonstrated in the drawing. The magnet can be an ordinary horseshoe affair, with about 25 turns of wire wound over each pole. Hook on a couple of batteries and let the hammer rest for a few minutes in the position shown.

Modernistic Book Case Has Simple Lines—Surprisingly Easy to Build

ANY living room will enjoy an enhancement of its beauty with this modernistic book case resting in some conspicuous location. The framework of the case is cut from % in. by 12 in. stock, beginning with the base and building upward. The bridge compartment is divided off as shown and the tally bin and pencil holder are made and fastened to the backs of their respective doors. The large drawer should be constructed from % in. stock except the front, which, like the doors, is cut from ½ in. stock.

After sanding and filling with a good paste filler, the case is given two coats of black enamel and two coats of silver trim on the edges. The doors and fronts of the drawers are marked off as shown, the squares being enameled silver and the corners black. The drawers and their compartments should be stained walnut inside. The knobs should be enameled black and mounted. Finally back the case with a sheet of wallboard. Many color combinations are appropriate.





Dimensions for compartments are given here. Case is backed with wallboard enameled black.

A Universal Bench Lathe Indicator

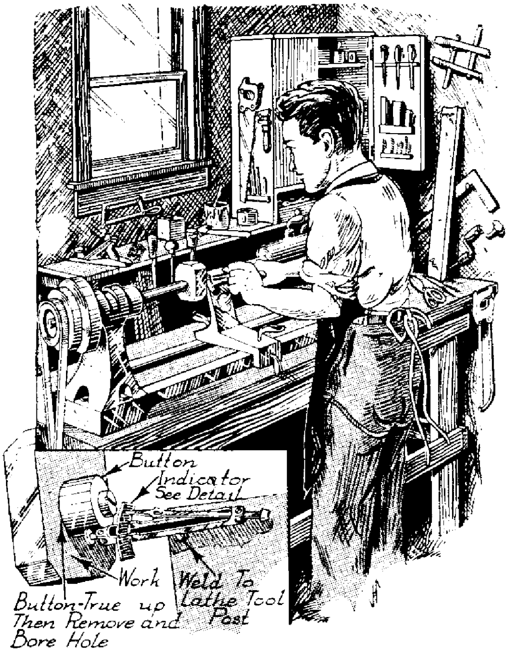
THE advantage of the bench lathe indicator shown here is that it can be used in any type of a lathe, large or small. Also that holes even less than ⅛ of an inch in diameter can be trued up with equal facility.

The frame or body of this indicator is shown in detail by Figure 1. This is preferably made from a piece of 13/32" drill rod 2⅞" long with 19/64" hole drilled through the whole length. At a distance of 3/10" from each end two diametrically opposite holes are drilled with a No. 50 twist drill which should be ground to cut to size as a No. 50 drill is the tap-drill for a 2-56 tap that is used after to tap the four holes that are to take the hardened pivot screws shown in Figure 2. It is, of course, optional with the maker the style of end that is made on the body piece—the ends can be either plain or fancy as shown in Figure 1.

After drilling and tapping the four end holes the shell of the body is milled down at the two points shown. The lower one for clearance and the upper one near the front 1/64" above center for holding the graduated slide C with tapered sides. The shank A is held to the body by a screw midway between the ends.

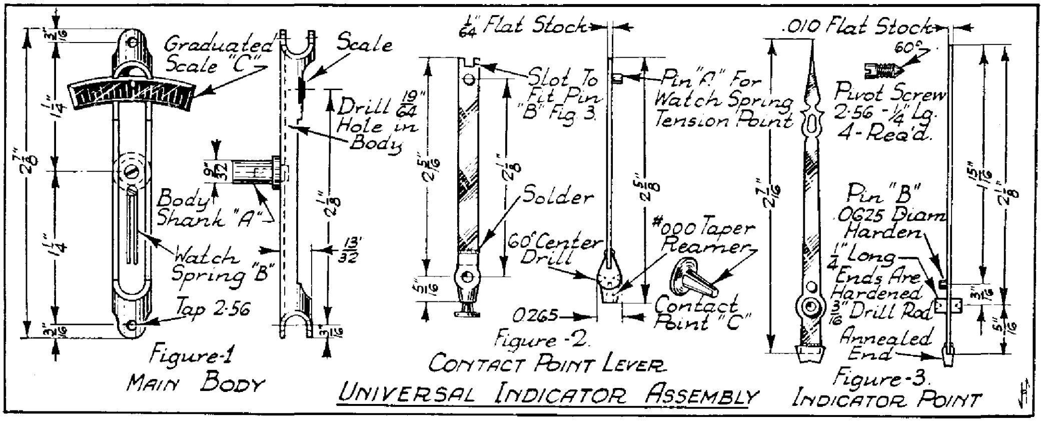
The piece of watchspring B acts as a tension against the pin A in Figure 2 and it is held to bottom of body by a small screw with a shoulder. The spring to use will have to be determined by experiment to get just the necessary pressure on the pin A in Figure 2 so that the pointer will return to zero on the scale.

The pointer shown in Figure 3 is balanced on the bearing end by a ¼" ball bearing that has been annealed and slotted to take the thickness of stock used in making the pointer. The pivot bearing is hardened and made a forced lit in the pointer. Its position in the pointer is determined by assembling together the indicator so that there is at least 1/64" space between the two levers.


Button
Indicator See Detail
Work
Weld To Lathe Tool Post
Button-True up Then Remove and Bore Hole

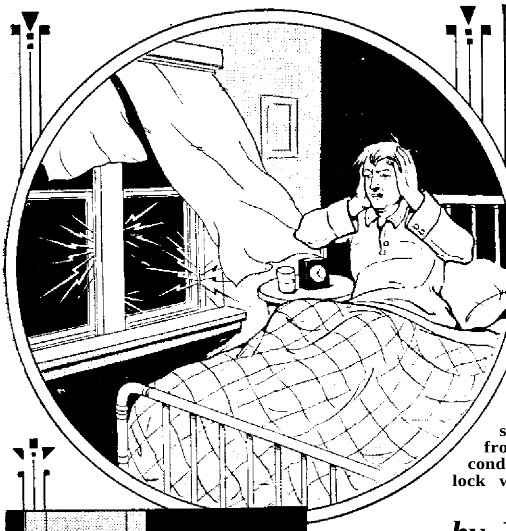
For small work which is irregular and difficult to chuck, indicator will save time in centering. Use shown to left.

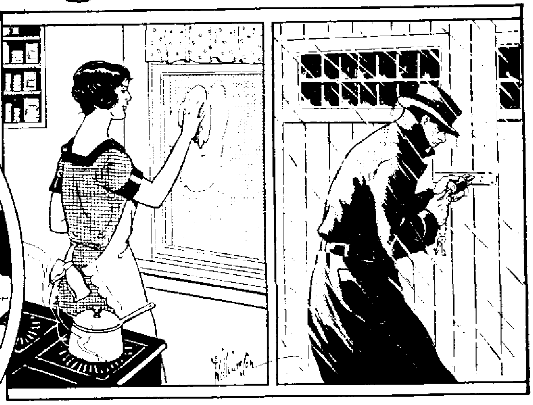
The only bearing is to be on the pivot points and the pins A in Figure 2 and B in Figure 3. All other points must be free. The pivot screws B in Figure 2 must be tempered and hardened and the points polished. These pivot screws are provided with hexagon check nuts which are tightened in place when the proper adjustment is found. The assembly view in Figure 1 shows the arrangement of the parts of the universal indicator. The sketches, Figures 1-2-3, give the necessary details.


Graduated Scale "C"
Scale
Drill 19/64" Hole in Body
Body Shank "A"
Watch Spring "B"
Tap 2-56
2 7/8"
1 1/4"
1 1/4"
3/16"
3/16"
9/32"
2 1/8"
13/32
3/16"
Figure-1
Main Body
1/64" Flat Stock
Slot To Fit Pin "B" Fig 3.
Pin "A" For Watch Spring Tension Point
2 5/16"
2 1/8"
2 5/8"
5/16"
Solder
60° Center Drill
#000 Taper Reamer
Contact Point "C"
0.265
Figure-2.
Contact Point Lever
Universal Indicator Assembly
.010 Flat Stock
60°
Pivot Screw 2-56 - 1/4" Lg. 4-Req'd.
2 7/16"
Pin "B" .0625 Diam Harden 1/4" Long Ends Are Hardened
3/16" Drill Rod
Annealed End
1 5/16"
2 1/8"
3/16
5/16"
Figure-3.
Indicator Point

This indicator is based on the double lever principle and is very sensitive. It can be used on holes as small as ⅛ inch and on stock which has no greater diameter than 1/16 inch, which fact will recommend it to model makers.

Fortunes *Waiting for Inventors*

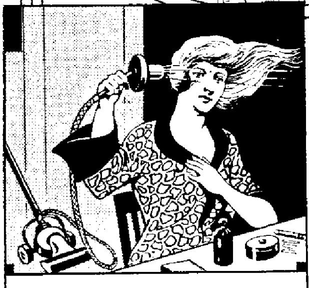




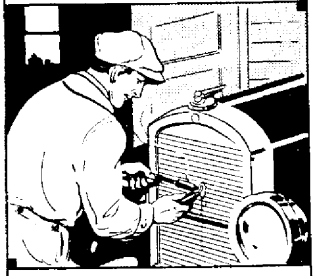
Here are shown three difficulties crying for a simple, cheap solution. In circle, a device is needed to prevent windows from rattling; above, an attachment for a gas stove to prevent condensation of moisture, fogging windows; and a self-oiling lock which will not rust hopelessly when not used for a while.

by RAYMOND F. YATES

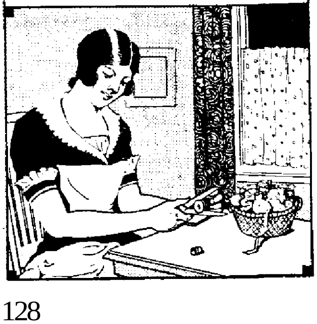
EDITOR'S NOTE: *Mr. Yates, the nationally recognized patent expert who conducts this department, mill answer questions of readers desiring advice on how to secure patents, methods of procedure, or ideas for inventions, when such requests are accompanied by a stamped, self-addressed envelope. Never send models; they cannot be accepted and no responsibility is assumed for them. Address Mr. Yates in care of* MODERN MECHANIX AND INVENTIONS, 529 *S. Seventh Street, Minneapolis, Minn. In some instances patents covering ideas similar to those mentioned here by Mr. Yates have been issued; but if described here, you may be sure that a simpler solution of the problem would be a money-maker.*



A simple attachment for a vacuum cleaner to convert it into a hair drying blower would build a real fortune for inventor.



Steel handles for tools have many advantages if weight problem is solved. Below, simple sharpener for beveled edges.



A New Unit Storage Battery

Of all the clumsy and utterly inefficient things that this civilization of ours is lugging along without, the storage battery just about takes the prize.

How many times have you gone to a battery repairman to have him tell you that one of the cells of the battery that you were using was dead? To replace this cell is not merely a matter of slipping a new one in place as it should be. There is a great deal of labor to it and you wind up with a five dollar bill blown to bits. Now why in the name of common sense can't we have a battery where a new cell could be slipped into place "just like that." Naturally some very efficient method of connecting the new cell in must be devised so that the change may be made quickly.

Specifications: This should be designed so that the replacement of a single cell could be accomplished with a minimum of labor, ten minutes being the figure aimed at. The battery should not cost any more than batteries now sold.

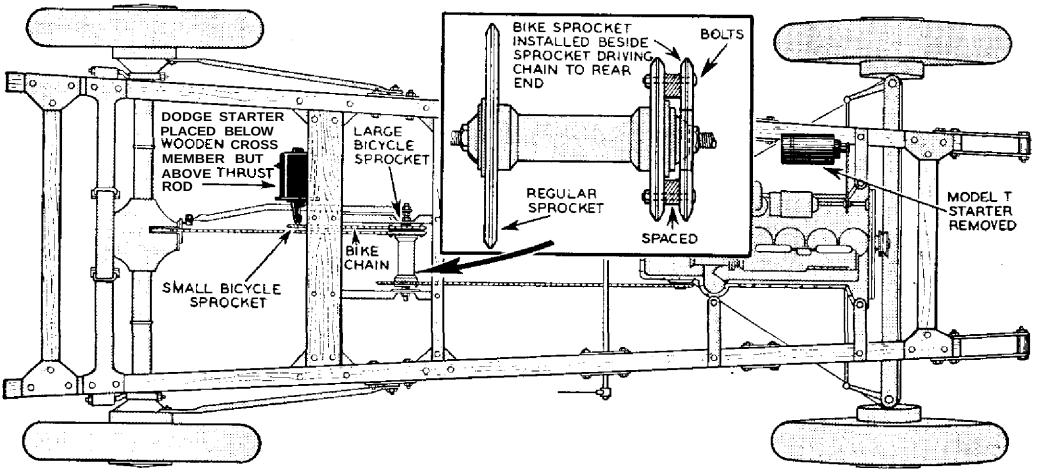
Exploitation: This should be patented only in the United States and should be sold outright for $100,000.

A Scissors Sharpener

A few years ago a very clever sharpening device for the kitchen was introduced. It consisted simply of a number

(Continued on page 140)

Reversing Arrangement for the Double M Sport Roadster


BIKE SPROCKET INSTALLED BESIDE SPROCKET DRIVING CHAIN TO REAR END
BOLTS
REGULAR SPROCKET
SPACED
DODGE STARTER PLACED BELOW WOODEN CROSS MEMBER BUT ABOVE THRUST ROD
LARGE BICYCLE SPROCKET
BIKE CHAIN
SMALL BICYCLE SPROCKET
MODEL T STARTER REMOVED

The starter motor is chained to the sprocket on the drive shaft as illustrated here. In operating, it is advisable to place the engine in neutral or disengage the clutch, thereby saving the starter motor the job of turning over the engine.

THE M. M. Sport Roadster plans published in the July, 1932 issue of Modern Mechanix did not make provision for a reverse gear. The car is easily handled, but occasions arise when some means of "backing up" would be appreciated.

All right. Here's the way it can be done. To reverse, all that is necessary is the pushing of a button, and in 4300 miles it has never failed to operate.

A six volt starting motor driving a small electric chain power transmission to the rear end is the secret.

Bike Chain Forms Transmission

The model "T" starter connected to your engine is removed. A large and small bicycle sprocket and their chain is procured. The smaller sprocket is attached to the shaft on the starter. The center of the large sprocket is cut out and bolted to the left countershaft sprocket as shown. Before bolting together a spacer is placed between these two sprockets so that the drive chain to the rear end will not interfere with the new chain to be used on the new sprocket.

A bracket is then made and attached to the frame on the left side of the chassis, and the starter with the small gear attached, is then bolted to the bracket. The chain is then put on over the two new sprockets. The motor, being mounted on the left side of the chassis, and turning clock-wise will now power a small auxiliary drive in reverse to the power applied by the engine.

Starter-generator Conserves Juice

The current consumption of the unit is low, but a generator of some sort may be found desirable, and a combination starter and generator from an old Dodge car may be installed in the place where you had the model "T" starter. This layout will start the engine and as soon as it commences to run, will automatically become a generator.

They may be picked up at any auto parts depot for very little and will be found to serve the purpose admirably.

As this is a twelve volt system two small six volt batteries should be installed in series. Only one of them is tapped for the reverse drive with the six volt motor.

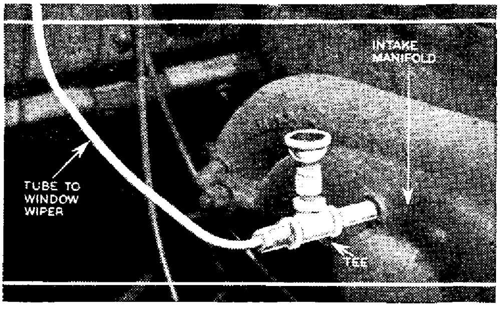
In operating your car in reverse it will be well to place the engine in neutral or disengage the clutch, thereby saving the reverse motor the job of turning over the engine, backwards, against compression.

In case you haven't the July, 1932, M-M issue at hand the editors will be glad to send you one for 25c.

Simple Automobile Valve Oiler

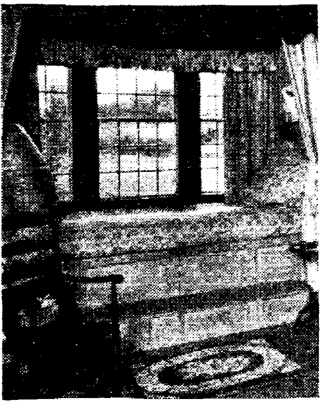
MOTORISTS who do not have their automobile engines fitted with a valve oiler will find this little device a great boon. It consists of a combined valve and priming cup, a pipe tee, and a nipple screwed into the place in the intake manifold where the tube leading to the windshield wiper is connected. The parts can be obtained at any hardware store.

Only oil should be used which is especially made for use in the upper parts of the engine to lubricate valves. The dose should be about a tablespoonful per cylinder, poured in the cup after the engine is warmed up and running. One filling about every 500 miles will give the best results.

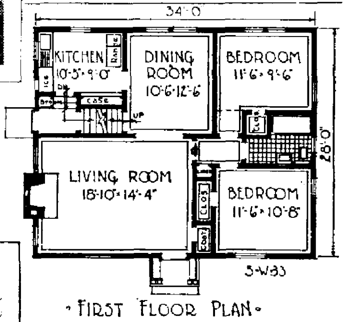


Nipple of the valve oiler screws into the windshield wiper hole on the intake manifold. Dose about every 500 miles.

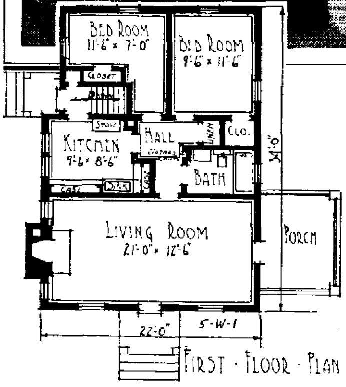
COLONIAL Houses are Most Popular



House built from plans No. 5-W-33 will always have highest resale value, since it is built in the best Colonial style, a style which never grows old. For complete blueprints for this house or house No. 5-W-1, shown below, send $1.00 to Modern Mechanix and Inventions Home Building Editors, 529 South 7th Street, Minneapolis, Minnesota. Photo at right shows restful little colonial window bed, ideal for afternoon naps on hot summer days.



Five rooms, well disposed, constitute the first floor dwelling equipment of house No. 5-W-33. Note fireplace at left in the living room.



House No. 5-W-1, is a four-room structure with the two bedrooms situated conveniently in the rear. The porch at the side can be used for sleeping in the summer, while the living room fireplace provides best indoor comfort in the winter time. Cost estimated at $5000,

by Maurice I. Flagg

IT IS safe to say that Colonial leads all other house styles in popularity. It's a style that does not grow old or go out of date. This one fact should be of importance to present day builders if for no other reason than that it insures maximum resale value. In other words, when you put money into a house you've made an investment. And to protect your investment you need style insurance. Colonial style is therefore much like an old line insurance policy. But there are differences in Colonial just as there are in automobiles, clothes and other commodities. It's well to know something about these differences and what constitutes the fundamentals of Colonial design.

Early Colonial homes were for the most part wood. Many were brick, but wood was the material generally used. And wood is a material easily worked into beautiful forms. Even today a wood house requires the least initial outlay of money and that's one reason why so many houses are built of this material. Which means, of course, economy of construction.

The popularity of Colonial is such that manufacturers have produced by machinery, stock details, stock interior and exterior finish in faithful duplication of the old pat-

(Continued on page 138)

GREATEST SPORT
ON WHEELS
that's motorcycling

SAVES MONEY, TOO

THINK of the sport you'd have with a swift, eager Harley-Davidson to whirl the miles away!

Wonderful vacations—Seeing America First. Week-end trips with a bunch of jolly riders. Rollicking rides in the evening—to chase dull care away.

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—that's the f.o.b. price of the 1933 Single. And it's a true Harley-Davidson—a completely equipped, speedy, sturdy, wonderfully economical motorcycle. Send for literature describing it and our Twins and Sidecars.

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Interested in your motorcycles. Send literature.

Name ______________________________

Address ______________________________

My age is ( ) 16-19 years, ( ) 20-30 years, ( ) 31 years and up, ( ) under 16 years. Check your age group.

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The Hemphill Home Study **Course** which includes **Practical** Shop Training in the famous Hemphill Schools prepares You for Big Pay Diesel jobs—employers depend on us for Diesel Engineers. You learn quickly—many successful graduates—Write Today for our Free illustrated booklet "Big Pay Diesel **Opportunities.**"

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PLASTIC RUBBER CO. OF AMERICA
Dept. C-235 E. Court St., Cincinnati, Ohio

Thousand Ways to Make a Living

(Continued from page 65)

will furnish you with a stock of books, for which a fixed fee or a small percentage of your earnings are charged. If none of these companies are accessible, you can purchase your own books, paying for them from your earnings. Stock only most popular books. These can be purchased at a surprisingly low cost at bargain sales. Read newspaper book reviews to find what books are most in demand.

Caring for Hardwood Floors

There's a field in every good sized town for a man who knows floors and can care for them properly. An electric floor polishing machine and an array of wood finishing materials will be your chief investment, and a knowledge of woods and finishes, which can be obtained from magazines, books and advertising matter, your chief mental requisite.

Building up a clientele may be accomplished by visiting stores where wood finishing materials are sold and asking them to recommend you to possible patrons. Personal telephone calls to clubs, churches, doctors and dentists offices, hospitals, gymnasiums and schools will yield additional jobs. When you've built up an extensive clientele you can hire an assistant to do the scraping, scouring, waxing, varnishing and polishing.

Motorboat and Picnic Trips

If you live near a lakeside summer resort, you can make money taking guests on day and evening picnic trips in a motorboat which you can rent from some owner if you do not have one yourself. Consult with resort proprietors, point out the advertising possibilities of your service (allow him a small commission if necessary) and post notices on the bulletin boards telling about your steak picnics, marshmallow roasts by moonlight, etc. Scout around for suitable spots for the excursions and arrange a repertoire of entertainment, in which history and legends of the locality can be interwoven.

Photo Birth Announcements

If you have a small hand camera with a reasonably good lens, you can make it pay you real money in this way: Follow the birth announcements in the newspapers. To each proud parent send a folder or sales letter explaining that you'll be glad to take a hurry-up picture of the new baby so that it may be sent out with the birth announcements going to friends. Enclose an appealing baby picture you have taken previously. This stunt will appeal to parents because professional photographers charge high prices for calls. Your picture need be only a snapshot, if it is of sufficient size. Printers will be glad to work with you in allowing commissions on stock announcements or special designs.

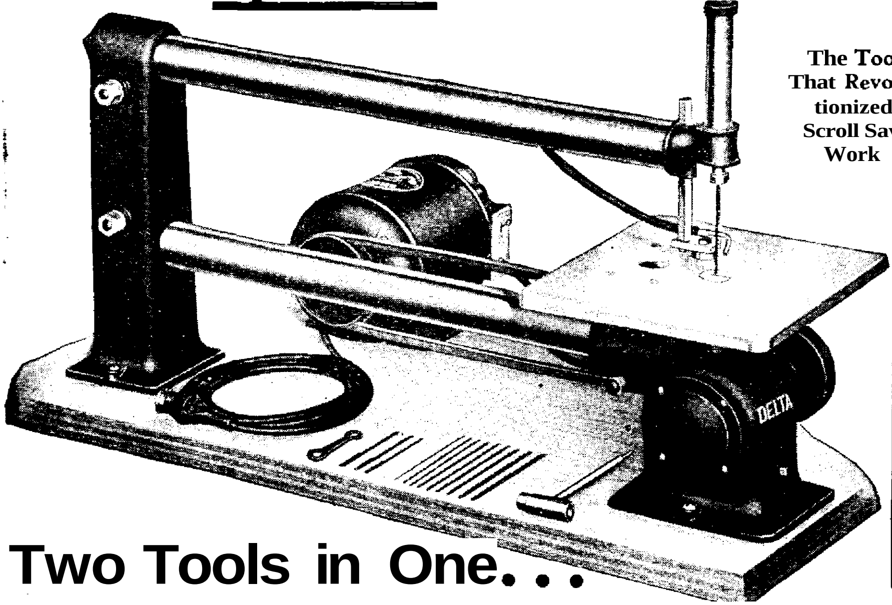
Loose-leaf Advertising

An advertising manager in retail lines, finding himself out of a job, took note of the waste of advertising matter which he discovered at his

(Continued on page 134)

New **Scroll Saw**

Makes Splendid Record of Performance



**The Tool
That Revolutionized
Scroll Saw
Work**

Amazing **Pencil** Test!

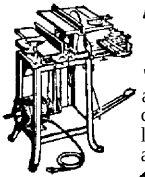
At 1,800 strokes per minute the "Delta" Scroll Saw has such perfect balance, such absence of vibration, that a pencil can be stood on end on the saw table without tipping over. This is the only scroll saw of this type on the market today that can pass this rigid test.

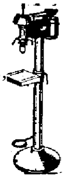
Two Tools in One. . .
Has Band Saw Efficiency!

SINCE its introduction last year this new model "Delta" Scroll Saw has been installed in many thousands of woodworking shops, home workshops, schools, jigsaw puzzle factories all over the United States. Everywhere it has made splendid records of achievement.

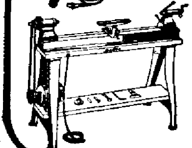
And no wonder! Its unique design and careful construction enable this saw to run at **full motor speed** with all springing and twisting eliminated. As a result, this amazing tool produces fine, smooth, accurate work hitherto possible only on a bandsaw. Has 24-inch throat capacity. Works on metal and fibre as well as wood. Can be used for filing, sanding, and honing. Priced astonishingly low For full details, send for the FREE 1933 "Delta" Catalog of Woodworking Units. Mail the coupon below—TODAY!

A Complete Line of "DELTA tools





"Delta" Woodworking Units, are convenient, portable, and compact. All are available in a large variety of combinations and at prices to fit all needs.



The "Delta" line includes: Jointers, Circular Saws, Band Saws, Woodturning Lathes, Drill Presses, Scroll Saws, Boring, Routing, Sanding, and Mortising Attachments — and a complete line of accessories.

10-DAY TRIAL

Easy Terms Because "Delta" Woodworking Tools are efficient and practical under actual working conditions, they are always available for a 10-Day Trial without the slightest risk. Satisfaction is guaranteed. For full details of this liberal offer and also of "Delta" Easy Payment Plans, fill in and mail the convenient coupon below—TODAY!

**DELTA MFG. CO., 3775 North Holton Street
Dept. M333, Milwaukee, Wisconsin**

FREE
Catalog

Describes the latest developments in motor-driven woodworking equipment at the astonishingly low 1933 price levels. Send the coupon Now !

**Delta Mfg. Co., 3775 N. Holton St,
Dept. M333 Milwaukee, Wis.**

Please place me, without obligation on mailing list to receive the FREE 1933 "Delta" Catalog of Quality Woodworking Tools. Also send full details of your 10-Day Trial Offer and Easy Payment Plans.

Name..Age ?........

Address..

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The World's Greatest
Opportunities are in

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Joe T. Vail, veteran transport pilot and flying instructor.

Get our part-time work Plan that helps pay your tuition.

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If you are unable to come to our school at present for your flying training, we offer you our approved home training course—the most complete and thorough, we believe, ever offered.

FREE BOOK

Get *all* the facts! Big *free* book tells everything . . . how part-time work helps pay tuition . . . how home training course prepares you for flying. Don't put this ad aside X before you mail the coupon.

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Dept. 2-C, Madison, Ind.
Rush free book. Also part-time work plan to help pay tuition.
My age is.......... (Check course in which interested)
( ) Private Pilot ( ) Transport Pilot
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Blueprints for Home Craftsmen!

New additions to the blueprints sold by Modern Mechanix and Inventions include such items as Electric Refrigerator, Eskimo Kyack, etc. See page 22 for details.

Photography for

PLEASURE or PROFIT

A fascinating hobby or a profitable business can now be yours. Prepare quickly at home under the personal guidance of leading experts in the fine art of photography, No experience necessary. Full or spare time. Many earn while learning. Our thorough studio method also qualifies you to fill a well paying position upon graduation. Send coupon now for FREE booklet, *Opportunities in Modern Photography*.

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Send FREE booklet, *Opportunities in Modern Photography*, and full information.
Name..............................
Address..............................
City..............................State..............................

Thousand Ways to Make a Living

(*Continued from page 132*)

front door each day. Visiting the neighborhood stores, he offered to issue a loose-leaf catalog and to distribute pages for it in place of the handbills usually used. Preparing copy, getting good printing prices, saving paper stock and distribution costs, he soon covered the entire district with advertising that was filed away in the loose-leaf binder instead of being thrown away. With prices little above those already being paid by the business houses he was able to make an excellent living and increase the pulling power of the advertising.

Rebinding Used Books

A St. Louis bookbinder out of employment turned up a lucrative business by distributing cards announcing that he would repair or rebind torn or broken books at reasonable prices. Those desiring his services were instructed to set one of the broken books in a window visible from the street. Driving along the street each day in his car, he was able quickly to get enough business to keep him busy and make him a good living. His children distributed the cards and he was able to control the amount of business for each day by limiting the number of cards distributed.

Rent Jig-saw Puzzles

During the current craze for jig-saw puzzles. fostered by a desire for home entertainment of light expense, boys and girls, men and women, can easily make a few dollars a week by establishing a jig-saw puzzle rental service in their home neighborhoods. They can make their own puzzles or buy them and rent them either on a flat basis of say twenty-five cents for two days or on a "circulating library basis" of fifteen cents for the first day, a dime for the second day. and five cents a day thereafter. The trick of success is to call at the door with the puzzles and leave a telephone number to be called when the customer wants to return the puzzle. Simple, cheap ones for kids; complicated ones for adults.

Night Snacks for Fraternity Houses

A very profitable source of income can be found in the fraternity houses on any university campus. One man has a little "traveling fireless cooker" mounted on wheels which keeps sandwiches and coffee. With a coffee pot, wax cups and cream, sugar and sandwiches he invades the houses at study hour in the evening,—a time when the kitchens are always closed and the ice boxes locked. Fifteen cents for sandwiches, a dime for coffee at this hour are not out of reason for the service involved.

Real Estate Agency

One woman who was suddenly widowed, found herself with a current load of responsibilities which could only be met by turning to what had been her chief interest—homes. She inserted an advertisement in a newspaper announcing "homes secured—desirable listings" for all types of homes. Then she got busy and really gave some active personal service to her business in getting homes rented for owners, in securing homes for people who were too busy to traipse around looking at the merits of this place and that. She made it her business to know and appraise rents, and was fair in all dealings. She now enjoys a greater income than her husband could furnish her.

Stamping Out Toys

One young mechanic found himself out of work and bent his wits toward the making of simple metal toy kits that could be produced on a simple punch press. The line he evolved was surprising: for less than three cents he found he could furnish all the parts to build a small electric motor, and a steam engine that would really run. He contacted a seller's representative through advice gained from the manager of his local ten cent store, and approached the New York chain store buyers through him. He has a plant working day and night now, and the sales are far from being supplied.

Children's Nursery or Shopping "Park"

Most every metropolitan city is now split up into small out-town shopping centers which serve rather wide areas of residences. They are also the gateways to the downtown districts. It is at such places as these that a Florida woman has rented upstairs quarters that would otherwise be vacant, and has made them into nurseries where mothers can "park" their kiddies for a moderate fee while mother goes shopping or to the movies. Many mothers these days are without maids due to the depression and welcome competent relief from this quarter.

Genius Breaks Counterfeit Rings

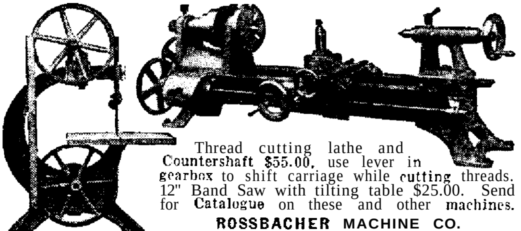
(Continued from page 41)

By Oct. 1 the counterfeiter's lair was traced to a storeroom in an old ramshackle building in an isolated section of Ozone Park, Long Island. Five members of the ring were nabbed in the raid.

Ironically enough, counterfeiters have been flourishing in these depression times when money is scarce. Every big city in the country has had to cope with a counterfeit money wave in recent months and the epidemic is far from being under absolute control.

Modern counterfeiters have quite a few tricks by which they fool the public. Their crudest device is "lifting," raising $1 to $10, or $2 to $20 or more by tacking on zeros. Although this is the most elementary, people are often fooled by it.

I have known some counterfeiters to split a bill and then paste one side of it to a fake note and do likewise with the other good half. Still other swindlers in this field are clever photographers and they reproduce a bill by the same process that a picture is made for a newspaper—these are the photo-engraving fakers.



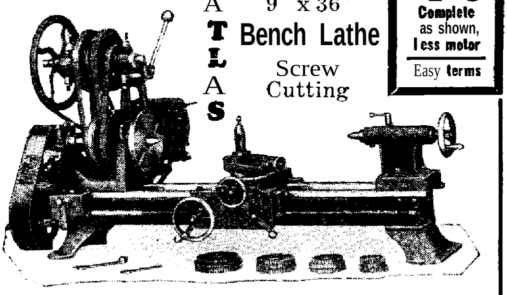
Thread cutting lathe and Countershaft $55.00, use lever in gearbox to shift carriage while cutting threads. 12" Band Saw with tilting table $25.00. Send for Catalogue on these and other machines.

ROSSBACHER MACHINE CO.
1516B Fernwood Ave. Toledo, Ohio

Here's Your Opportunity!

$79 Complete as shown, less motor
Easy terms

ATLAS 9" x 36" Bench Lathe
Screw Cutting



Think of it! You can now obtain a first quality Bench Lathe for only $79. ($89, equipped with motor, ready to use—just plug it into a lamp socket and turn on the switch.)

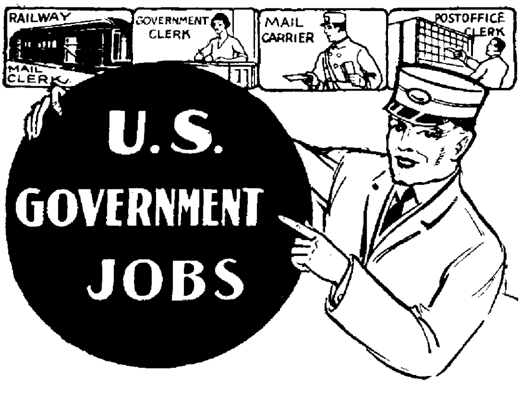
9-inch swing; takes 18" between centers. Larger sizes available.

Cuts 4 to 80 threads per inch; automatic, reversible carriage feed; compound rest; six speeds, from 47 to 600 R.P.M.; Vee Belt drive—the modern method of transporting power that minimizes slippage and increases power.

A small down payment puts this fine Lathe in your home or shop!

Write for details now!

ATLAS PRESS CO. 1852 No. Pitcher St.
Kalamazoo, Michigan



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HELPS *for*
Home Builders
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How to **Build—What** to Build When **to** Build

A gold mine of facts can often be converted into a gold mine of dollars. For builders not only save money but learn how to make more money with the five big books on architecture, carpentry and building. Carpenters make themselves contractors by learning how to estimate correctly; contractors are able to handle bigger and more profitable jobs by learning how the big fellows do it. Men who want to build homes can save money by learning how it should be done. The new Jiffy Index puts before your eyes without wasted time, the things you want to know. Nothing has been overlooked. Use of tools, building construction, heating, lighting, plumbing, architectural drawing; all fully covered. We will include with the five volumes above, at the special reduced price of only $19.80 (easy payments) a handsome book, "Blueprint Reading," 120 pages, full diagrams, etc., without extra charge.

No Money Needed — Don't Send a Penny

You take *no* chance of any kind. Just send us your name and address on the coupon and we will ship the complete set of five big volumes, 2,400 pages, without a penny of down payment. Look them over, find out anything you want to know and then, at the end of ten days, if you want to keep them, send only $2.00. After that send only $3.00 per month until the special price of only $19.80 has been paid. (Former price, $24.80.)

FOR FREE OFFER USE **COUPON**

American Technical Society, Dept. **G-3320**,
Drexel Ave. **at** 58th St., Chicago, **Ill.**

I would like to look at the five books described above. Send them on your free offer. I will examine them thoroughly and return them in ten days unless I like them, in which case I will send you $2.00 and after that $3.00 per month until the total price of only $19.80 is paid. You are also to send me your book, "Blueprint Reading," without extra charge.

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JUST SAY: "Shoes Re-soled for 8½¢ a Pair!"

Write for FREE SAMPLE!

Mends a hole or straightens a heel for 1 cent. New plastic invention—SAVASOLE—spreads on soles like butter on bread. Hardens over-night into smooth, strong wearing surface. No Nails. Old knife only tool. Child can apply. "New" soles and heels look and feel like leather.

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Dept. **C-41** **Cincinnati,** Ohio

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A CONCISE, comprehensive course in Electrical Engineering to prepare ambitious young men of limited time for new opportunities in the electrical field. Mathematics, engineering drawing and intensive shop-work. Students construct motors, install wiring, test electrical machinery.

Bliss Men Make Good

PREPARE NOW for future opportunities. 30 years' successful experience assures you maximum training in minimum time. Catalog on request.

BLISS ELECTRICAL SCHOOL
303 Takoma Ave., Washington, D.C.

A Gravity-driven "Flutter-round"

(Continued from page 113)

The rigid radial cross pieces are bolted to a large floor flange, which is fitted with a length of pipe that serves as the vertical axle. Ordinary water or gas pipe will not do; it is likely to break off at the threads. One should obtain a 12" length of high-pressure steam pipe or heavy-walled refrigeration pipe. If only ordinary pipe is available, reinforce it with a piece inside and braze the whole to the floor flange.

It is desirable to have a roller bearing on top of the pedestal post for the floor flange to revolve on, and a suitable one can be found at almost any auto wrecking yard for two bits.

The construction of the handholds and footrests is quite obvious. These should be made of straight-grained stock, as they are sometimes put to considerable strain.

Note the little stop-blocks screwed to the ends of the rigid cross pieces. These are to limit the movement of the sliding cross pieces. The seats can readily be cut out with a key-hole saw—or, better still, with a home workshop bandsaw.

There! The "Flutter-round" is almost ready to flutter around. The final operation is to sand the sliding surfaces and treat them copiously with floor wax. Of course, riders of approximately equal weight should sit opposite each other.

THE GREATEST BUY

$1.98 Hand-made—6 ft. LEMONWOOD BOW and Arrow
Tax and post-paid

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Guaranteed to detect gold and silver anywhere. Used by Tourists, Prospectors, Boy Scouts, men and boys everywhere to locate lost jewelry, buried treasure, rich gold pockets and mines. Many recent fortunes made by gold seekers. Sonora prospector located $2000 in gold nuggets. Send $1 for small size, $1.50 std. size, or $3 for professional size in leathercase, and literature. 10-day money refund guarantee.

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The accounting department is the heart of any business. Here are gathered, correlated and interpreted the facts about every phase of the business. Here is determined the management of money—the life blood of the business. That is why the accounting executive is an important executive —well paid, respected, consulted by his superiors—in an unusual position to know and to grow.

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An interesting **64-page** booklet, "Accountancy, the Profession That Pays," analyzes the various fields of accounting, describes the problems and opportunities in this growing profession and tells how you may qualify for success in it. This book is free. Ask for it by **writing—today.**

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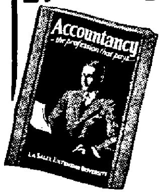
The school that has trained over 1,150 C.P.A.'s
Dept. 3493-HR - Chicago, Ill.



Gentlemen:
Please send me—free of all cost or obligation—your booklet on "Accountancy, the Profession That Pays," and full information about how I can prepare for success in **executive accounting.**

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Address..

Position.................. Age......

MORE THAN 100 SHAVES From One Blade!

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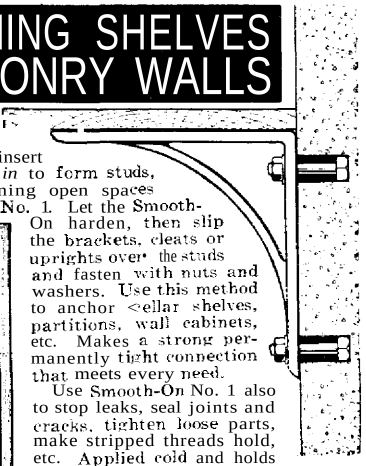
Superior to anything on market. What a seller! New razor blade sharpener, taking country by storm. **Not made** of glass, **fibre**, celluloid, etc., but the finest abrasive obtainable which is absolutely essential for the sharpening of Steel. Puts a hair splitting edge on the **dullest razor blade—any make—in few** seconds. Our **agents—salesmen—distributors—make** big money from start.

WRITE AT ONCE!

You are losing money by **delaying.** See the Goodrich Hone. Use it and sell yourself. Don't put **off writing.** Act **now!** SAMPLE 25c. One half dozen $1.00. 1 **doz.** $1.80,

Goodrich Manufacturing Co. Estab. 1864 **1500 W. MADISON DEPT B-1, CHICAGO**

FASTENING SHELVES to MASONRY WALLS



Cut holes into the masonry with a cold chisel, insert bolts *with heads in* to form studs, and tamp remaining open spaces full of Smooth-On No. 1. Let the Smooth-On harden, then slip the brackets, cleats or uprights over the studs and fasten with nuts and washers. Use this method to anchor cellar shelves, partitions, wall cabinets, etc. Makes a strong permanently tight connection that meets every need.

Use Smooth-On No. 1 also to stop leaks, seal joints and cracks, tighten loose parts, make stripped threads hold, etc. Applied cold and holds in metal, concrete, masonry, tile or wood.

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SMOOTH-ON
No. 1
CEMENTS IRON
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Write For
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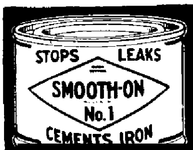
Get Smooth-On No. 1 in 7-oz., 1-lb. or 5-lb. tins from any hardware store.



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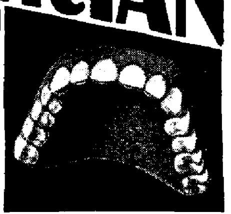
To make Crowns, Plates, Bridgework, etc., for **Dentists.** Easy, practical way to learn mechanical dentistry at home in spare time. Full equipment of TOOLS AND MATERIALS INCLUDED WITH COURSE FREE. Low tuition Easy terms. Write for FREE BOOK about this money making profession and our easy-to-learn home study course and special offer.



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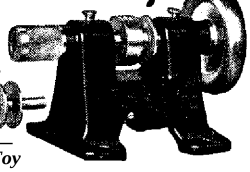
CARVE, **DISC, DRILL, GRIND, POLISH**



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MASTER BENCH HEAD **BUILT TO LAST A LIFETIME**

Each attachment is mounted on a mandrel and is in perfect alignment. To change attachments, merely loosen handwheel and slip into draw-in collett. List price $4.00.

Special Offer. **Send $3.00 for Master Bench Head** postpaid or C.O. D. We will send you FREE one 4"x ¾" all-purpose grinding wheel and 4" buff mounted on separate mandrels. Write for booklet.

WISCONSIN ABRASIVE COMPANY
Dept. 8503 Station A Milwaukee, Wis.

Why Colonial Houses Are Popular

(Continued from page 130)

terns. This gives you a decided price advantage, being able to buy from stock what in the old days was made by hand and beyond the reach of the modern average pocket book if made by hand today.

I have selected two bungalows for this issue in Colonial design. No. 5-W-33 planned for a 45-foot lot offers two bedrooms, a bathroom, dining room, kitchen, large living room with fireplace on the first floor. Stairs lead to storage space above which can be used for added sleeping quarters if desired.

The house is frame construction, siding exterior, shingle roof, and has a full basement. Dormer windows add much to the pleasing appearance, as do the blinds. The cost to build? A present day price range suggests $5500—perhaps more and perhaps less, depending upon where and how the house is built. It is a sound plan and the style as I have said will be permanent.

Plan 5-W-I is a four-room equipment with two bedrooms at the rear of the house, a large living room across the entire front of the house, a kitchen and bathroom all on one floor. There's a fireplace and also porch which can be enclosed or open as preferred. Space above may be reached through a hatch in the rear hall. This house is frame construction, siding exterior, shingle roof and has a full basement. The cost should be considerably less than $5000 at today's prices for materials and labor.

Listen to Police vs. Crime on Radio

(Continued from page 110)

Wave-length (Meters)	Frequency (Kilo-cycles)	Call Letters	Location
123.8	2.122	KSW	Berkeley, Cal.
		WMJ	Buffalo, N. Y.
		KGPE	Kansas City, Mo.
		KGPG	Vallejo, Cal.
		WPDW	Washington, D. C.
124.1	2.416	KGPB	Minneapolis. Minn.
		WPDS	St. Paul, Minn.
324.2	2,414	WPDY	Atlanta, Ga.
		KGPS	Bakersfield, Cal.
		WCK	Belle Island, Mich.
		WPDX	Detroit, Mich.
		WRDR	Grosse Point Village. Mich.
324.2	2.414	WMO	Highland Park, Mich.
		KGPA	Seattle, Wash.
		WPDA	Tulare, Cal.
175.15	3,712	KGPJ	Beaumont, Tex.
		WPDB	Chicago, Ill.
		WPDC	Chicago, Ill.
		WPDD	Chicago, Ill-
		WKDU	Cincinnati. Ohio
		KVP	Dallas, Tex.
		KGPL	Los Angeles, Cal.
		KGJX	Pasadena, Cal.
		WPDU	Pittsburgh. Pa.
		KGPC	St. Louis, Mo.
189.5	1.574	WRDS	E. Lansing, Mich.
		WMP	Framingham, Mass.
		KGPY	Shreveport, La.

5¢ & 10¢ COUNTER GOODS
BIG PROFIT MAKERS

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FOR YOUR PROTECTION
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Call on dealers—demonstrate World's greatest line Counter Card Goods: Aspirin, complete line Razor Blades, Mercurochrome, Peanuts, 65 big, new profit makers. Powerful, self-selling displays. Big profits for dealers and you. Permanent. repeating busines [illegible] to start. Send for Big 64-page FREE Catalog.

WORLD'S **PRODUCTS** CO.
Dept. 3814 **Spencer, Ind.**

"Penguinette"—Power Puffmobile

(Continued from page 104)

the size and type of wheel shown in the design. I have seen too many fellows tackle things like this using scraps and odds and ends gathered from Java to Timbuctoo and then crab because the whole affair was a disappointment. Therefore I explain why wheels. as being a most important element, must be intelligently selected and rigidly installed.

The matter of suspension is my own idea, and I'm proud of it. A U bolt is run through one side of the axle beam and bolted topside and underside. Then 2½″ from the underside this ⅜″ bolt is bent and the axle, through which a ⅜″ plus hole has been drilled, is slipped on. This hole and pin act as a trunnion which allows a teeter totter motion to the axle.

The axle is then bound tightly to the axle beam with shock cord, and a guide pin fastened to the axle which will keep the stub shaft laterally in line. Thus by this device resiliency of proper degree is obtained on the axle shaft, and the car made very easy riding. More, the tension is readily adjustable by tightening or loosening the cord. This then completes our chassis and wheel suspension. Next comes the matter of steering.

Steering

In order to keep the car frame at the same level the steering trail fork has a right angle bend in it running up through a collar at the apex of the frame. The detail in Detail 2 explains this, while in Detail 1 the wheel and axle construction mentioned above is clearly depicted.

The controls are the regular pedal controls such as any airplane uses. Piano wire will be found the most usable tension cord to string from the pedals to the rudder bar.

Seat

The seat, which completes the car, is made of simple boards, nailed as previously described with 6 D nails when finished, and the shock absorbers installed on the axles and wheels, the chassis is complete.

Power **Plant**

Now for the matter of the power plant. The mounting of the propeller is cared for through a simple double N strut made out of ¼″ by 1¼″ strap iron. Two A frames are bent up, and drilled for the bottom holes in the feet, and for the jackshaft holes at the apex of the A, which should be about 8" across.

The feet are bolted, and secured with 4" long ¼″ carriage bolts.

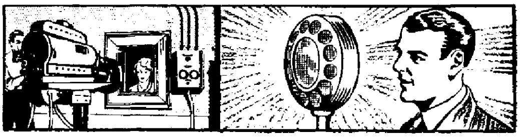
Next the jackshaft is fastened on. This can be any jackshaft such as are sold by the Driver or the Delta people. I believe the one I used was a "Wallace." It cost three bucks with both bearings, and thrust collars and mandrel plates. Cheaper than you could have it built, and it has oil cups. Worked very satisfactorily.

When the jackshaft is bolted down, the frames will be in line and will need but slight pressure while a mechanic welds the N piece in the system. The minute the weld is set the shaft mounting is complete.

All remaining is the placing of the motor and the securing of pulleys and belts with which to drive the prop, and the prop itself.

(Continued on last page)

LEARN in CALIFORNIA



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TALKING PICTURES

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30x5.00-20	2.60	1.08
28x5.25-18	2.65	1.19
29x5.25-19	2.75	1.19
30x5.25-20	2.75	1.19
31x5.25-21	2.95	1.19
28x5.50-18	2.95	1.19
29x5.50-19	2.95	1.19
30x6.00-18	2.95	1.19
31x6.00-19	2.95	1.19
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Fortune Making Ideas for Inventors

(Continued from page 128)

of steel wheels mounted in such a manner that when a knife was drawn between them, it would have a new edge cut upon it. Millions of these little things sold. Now this was a very efficient sharpener but there was one thing that it could not sharpen for the simple reason that a bevel edge was needed. We refer to a pair of shears. What is needed is a little thing that will sell for a nickel in the five and dime and which will, by simple manipulation, place an edge upon such an instrument.

Specifications: The bevel edges of the shear blades should be preserved perfectly by the device and it should be borne in mind that the little tool should be so simple that it could be manipulated perfectly by any housewife. If it can be made of pressed metal, so much the better. In keeping the price of the gadget at ten cents, a large market is assured for it.

Exploitation: Should be patented in all of the leading countries of the world and should be sold entirely on a royalty basis.

Self-oiling Lock

Locks, when they are exposed to dampness and the weather, often become rusted and fail to perform as they should. As a matter of fact, many cannot be opened if they are permitted to stand unused for any great length of time. What is needed is a lock that will always work easily, never rust no matter what the surrounding conditions are. Should there not be some way in which oil or grease could be stored in such a lock in a manner which would assure the lock a long and useful life?

Specifications: Should add but a few cents to the cost of a lock and should in no case permit oil to reach the key.

Exploitation: Should be patented in every large country of the world and should be sold only by license and royalty.

Supplying Water to Hot Air Furnaces

On practically every hot air furnace in use today, the owner will find a small water compartment into which water is placed. This water is slowly evaporated and carried with the warm air to the registers. This is done to keep the air in a house moist. From a health standpoint it is very necessary, but few people use this feature on their furnaces for the simple reason that they are either too lazy to fill the pan with water or else they forget to do it.

Now what we need is an automatic method of accomplishing this. Naturally the little water tank, which usually holds one or two gallons, should be connected to the house water system and some system, guided perhaps by a float, should keep the tank filled.

Specifications: Should not add over five dollars to the total cost of installing a hot air furnace. There must be no danger of the device flooding the cellar.

Exploitation: Inasmuch as central heating plants are used in the United States much more than they are used in Europe, the device should be patented only in this country and Canada.

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Fortune Making Ideas for Inventors

An Attachment for a Gas Stove

Those who use gas either for cooking or for heating are constantly being annoyed by the condensation of moisture on windows, walls and even furniture. What is needed is a simple attachment for a gas stove that will absorb the larger percentage of this moisture or at least carry it away. Our large gas companies would give a great deal for an invention of this kind, providing it were simple enough, for a large number of people do not use gas for this very reason.

Specifications: Should be cheap and simple and should not cost over five dollars installed.

Exploitation: Should be patented in the United States and Canada only where gas is used to the largest extent.

Rattling Windows

What we are trying to do in this department is to keep our eyes open for the little things that make big fortunes. It is not always the big, complicated ideas that make the "big" money, although many of them have. It is the little and often unexpected things that pile up the bank account. All of this by way of introducing the subject of rattling windows. Every household has one or more of them. Why then, not develop a small spring of some kind that may be slipped in place between the window and the frame that will keep the latter from rattling? Now it is obvious in the case under consideration that we must not only be able to slip this spring in place so that the window will not rattle, but that we must also be able to extract it—quickly and easily when we wish to lower or raise the window. This puts an altogether new angle on the problem.

Specifications: Should be patented in all of the leading countries of the world and should be made to sell for ten cents. Should be made of non-rusting material, preferably pressed metal.

Steel Handled Tools

We are living in a metallic age. Everywhere steel and iron in sheet form is replacing the older methods of wooden construction. Now there is a need for sheet steel tool handles for axes, hammers and the like. What is needed is a handle that will not break and that will be light in weight

(Continued on page 142)

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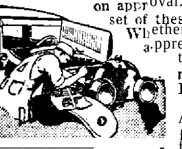

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HOW TO BUILD 20 BOATS!
See page 35

Fortune Making Ideas for Inventors

(Continued from page 141)

— as light or even lighter than wood now used. This type of handle would offer a much better opportunity to fasten the tool to it than is offered by the wooden handles now in use.

Specifications: Should be made hollow in such a way that it would rival wood in cheapness and yet have more strength. It should also have a certain amount of resiliency or "give" to prevent the handle from breaking when a smart blow is struck.

Exploitation: Should be patented in all the countries of the world having patent laws.

A Modern Hair Dryer

The thing that I am about to mention is so obvious that I am really surprised that it has not been thought of before. What I have in mind is a heating attachment (electrical in nature) that could be placed on the blower end of a vacuum cleaner (through the medium of the tube which is used for blowing the dust out of corners) and used for drying hair. This would offer a really fine and practical method of drying and one that would be just as efficient as those used in the beauty parlors. The vacuum motor would blow the air out of the end of the hose and the heating unit, which might be the same as that used in small heaters of the bowl type, would heat the air as it passed.

Specifications: Should be cheap and made in such a way that it could be attached to any standard machine. If this unit could be made to sell for a few dollars, a ready market of over five millions would be available for that is the number of vacuum cleaners in use in the United States today.

Exploitation: Should be patented only in the United States and Canada where these machines are widely used.

Bridge for Electrical Experimenters

(Continued from page 111)

In wiring, use No. 18 insulated wire to keep all undue resistances out of the circuit, which is given in the drawings.

Finish off the box and give it a coat of stain or paint and you will have a nice looking instrument.

The principle of the Wheatstone Bridge is that four resistances are in a circuit as shown in the diagram; one of them being unknown. Switch on the current and, if all resistances are alike, no current will flow through the galvanometer and its needle will remain quiet.

If the unknown resistance varies from the others then the rheostats A, B and C will have to be adjusted until the needle shows no deflection. Knowing the values of A, B and C you can then use the formula A over B equals X (unknown) over C.

Taking the scale readings of A, B and C it will be easy to determine the resistance of the unknown X. Any text book will give you the various methods of determining unknown inductance and capacity values too lengthy for this article.

Parlor Magic With Cigarettes

(Continued from page 69)

holds the even pile while the spectator has the odds. Strange as it may seem, there is no explanation—you just do it, that's all!

Consider: You can cut the circular trade mark from a Lucky Strike, moisten it with saliva, and paste it over the Camel trade mark so that the gimmicking can never be noticed, as shown in the progressive pictures of the operation. Does that suggest anything? No? How about this: The performer takes a number of cigarettes and places them into a hat. He takes a single cigarette of another brand and places it, also, into the hat. He stirs the cigs around. When the contents of the hat are brought forth, one smoke at a time, all of the cigarettes are found to be of the same brand. Of course, no one ever guesses that the odd Lucky Strike (really the doctored Camel) is prepared. It looks so natural. Neither does anyone see you remove the trademark and roll it between your fingers, all of this being done within the hat or your pocket.

If you like manipulations, try a little sleight shown in the illustrations to the upper right. The important movement is pictured in Fig. 11, where the right hand fingers are brushed slightly over the left hand fingers, causing the cigarette to spring back into the right hand where it is retained by slightly compressing the fingers. The subsequent reproduction of the smoke from the air or the pocket needs no explanation.

Lifting **Four** Smokes **Sans** Fingers

Can you lift four cigarettes with a matchbox cover? And this without touching the cigarettes with your hands or pushing the smokes over the table? By placing the mouth over the open end of the upright cover and inhaling strongly, a partial vacuum can be created, sufficient to hold the cigarettes in place until the position shown in the photograph can be assumed.

Clever, no end!

Hobby Department

(Continued from page 80)

5c blue, and 8c orange.

A new 60c apple green stamp bearing the portrait of Emilio Castelar has been issued by Spain.

Three lithographed examples from Peru give evidence of having been derived from ancient Inca sources. They are in 10c, 15c, and 50c denominations, printed in purple, lake, and sepia, respectively, and bear the inscriptions "Parakas," "Chimu," and "Inka."

Russia is represented with a series of five pictorials. Lenin addressing a crowd ornaments the 3 kopec violet, while the 5 kopec brown shows a view of Moscow's famous Red Square. The Dnieperstroy power plant, whose completion has just been celebrated, is depicted on the 10 kopec blue. This gigantic engineering project is the one which has been taking shape, under the guidance of American experts, for the past five years. A quiet farming scene is shown on the 15 kopec green, while the 35 kopec gray purple bursts to an allegorical conclusion with light rays pointing to the word "Lenin."

Three series of Finland's Red Cross issue have been announced. They are of 1¼, 2, and 2½ mks., and each carries the portrait of a separate bishop prominent in the country's religious history.

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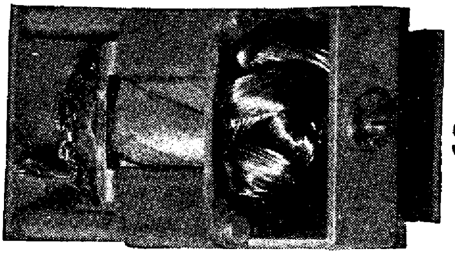

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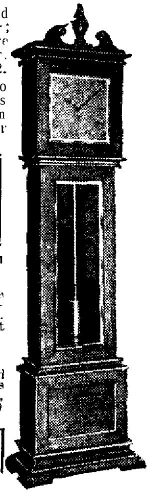

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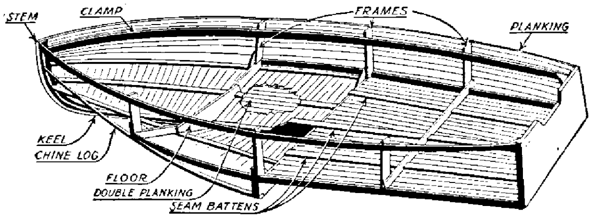

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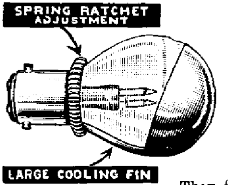

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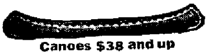
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How to Build a Kyack

(Continued from page 118)

applied before the covering operation is started and the boat is removed from the horse. The strips of paper are allowed to overrun the clamps and the whole side is trimmed with a safety razor blade after all covering is completed. The molds must be removed before the deck is applied.

The cockpit is framed as shown on the plan and the deck fabric is stretched from clamp to clamp, lengthwise to a reasonably tight fit, then given three coats of clear or pigmented airplane dope.

Around the edges of the sheer line a piece of pinked airplane tape is doped down to the deck and side to cover up the raw edges of the deck and side and the guard of ash is fastened through the paper and capped with a piece of duraluminum molding as shown. The outer keel is made in a similar manner and fastened through the paper as shown. Stem pieces of a section similar to the guards should be bent up from ash and fastened to the stem pieces as shown in section.

After the paper is securely fastened to the frame it should be given two coats of varnish inside before the deck is fitted and when the deck is fitted the whole outside should be given two coats of varnish. After varnishing the outside may be painted to suit the builder's fancy either in the style used by the Esquimaux or in the conventional colors of the modern canoes. Each coat of color should be sanded down and the outside will soon take on the high gloss so necessary to speed through the water.

If the kyack is to be used in sheltered waters no finish around the cockpit is necessary other than a roll of imitation leather stuffed with horsehair or kapok similar to the padding of the rim of an airplane cockpit. For open water work the cockpit should have a coaming two inches high made by bending up a ring of three turns of 1/16" veneer and capped with a half round molding about a half inch wide. For summer work the only thing necessary to keep the water out will be a sleeve of canvas as shown on the plans with a drawing string worked into the top and the bottom. This sleeve is drawn tight around the cockpit coaming and around the waist of the paddler which will keep out almost any water that will sweep over the deck. For winter and fall when the winds are biting and cold spray is flying the real Esquimau parka will be necessary. This is made by first taking apart an old coat; and, using this for a pattern, the various parts are made from light canvas or twilled muslin. A collar is added as shown as is also the shield inside the collar.

Eyelets are inserted in the throat for lacing and drawing strings are worked into the sleeves and waist. It will be a whole lot more comfortable if the sleeves are quilted around the wrists where the drawing strings bear on the wrists; this will also insure better watertightness. For very cold weather the parka should be given a lining of muslin with kapok quilted between to provide the insulation needed against the cold. A blanket of muslin with kapok quilted in it will keep the paddler's legs warm. All quilting should be done after the outer fabric has been waterproofed with a paint whose formula is shown on the plan.

There are many tricks to handling a kyack and no one without a little canoe experience should attempt it. To the experienced canoeist the kyack will prove an interesting diversion and it may be stocked with all sorts of supplies for an extended cruise. I have seen the Eskies roll these craft over and over in exhibitions and to the white man this appears as only a stunt but Willie Eskimo often has to resort to this trick to escape the onrush of an enraged bull walrus. He cannot turn his kyack quick enough and if he could there is always the chance of getting caught broadside so he simply rolls over and over across the water to a safe area. This is one of the reasons why the Esquimau does not use the double paddles feathered as do the devotees of the double paddle in civilized countries. He must rely on the grip of both of his blades to do the roll.

The rolling trick is easy to do after a little practice which should be indulged in on shallow water with an assistant standing by to help you if you fail to come up to complete the roll. It is executed by laying the double paddle alongside the kyack and submerging it as deep as the length of the arms will permit. By this time your weight has brought the kyack near to the capsizing point and over she goes. The uprighting operation of the roll is accomplished by swinging the paddle to the far side and with a downward sweep and a quick lurch of the body the kyack is righted.

A rubber ball cut in half and slipped over the shafts of the paddles will form effective cups to catch the water that runs down the blades. For fishing operations a light anchor may be made as shown on the sketch and this is rigged off a ring bolt in the bow. A retrieving line must be run for half a boat's length down the main anchor line and fastened near the cockpit so that the anchor may be hove up from the cockpit as it is impossible to get forward to do this.

Now for some don'ts on the construction. Don't forget to drill for all fastenings, the material is necessarily light and will split easily. Don't get the paper too wet in applying it as unfair lines between the ribs will appear where the pull of the paper becomes excessive. Don't apply varnish anywhere before doping except inside the boat where dope will never get to, dope is a good varnish remover but varnish will not affect dope after it is dry.

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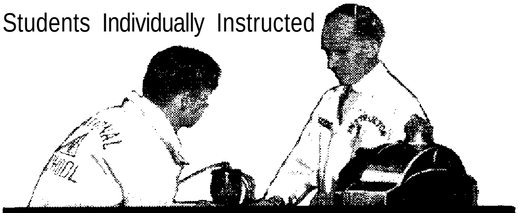

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"Penguinette"—Power Puffmobile

(*Continued from page 139*)

The Delta Manufacturing Company, which advertises in Modern Mechanix and Inventions this issue, will be pleased to send you their catalog. In it they show belts and pulleys of all different sizes which you can adapt to your needs.

We used a ½ h. p. washing machine motor which turned at 1750 r.p.m. A 1 to 2 reduction turned a 4 ft. 4" diameter by 2 ft. 6" pitch prop at 800 r.p.m. through a V belt, allowing a little for slippage. This would start a load of 185 lbs. crew and 150 lbs. auto and attain a speed of close to twenty miles an hour. The same size propeller should be used no matter what power, and the 8" Delta pulley should be used to drive the jackshaft. With greater power, higher prop speed, one would have a job that started quicker and would attain a higher terminal speed.

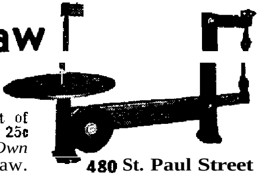
If the matter of braking is considered, it should be applied to the rear wheel only, the matter of attaining even pressures on the front wheels, and thus avoiding turning effort which would make for accidents, is a difficult problem. After all one will have the most fun with this machine on the open expanses of country road, or on the ice either as a car or a sled.

For actually serious service in the city, two additions will have to be made which somewhat rob the car of its charming simplicity.

One of these is the matter of a shroud for the propeller if you use powers higher than ½ h.p., and the other is the matter of some sort of nacelle to keep dust and horsefeathers from blowing up into your face.

For a propeller shroud, since the motor may be started by pulling on the V belt, ordinary coarse mesh galvanized screening, such as used by contractors in grading sand, will be amenable to soldering, and simple fabrication.

A fuselage can be provided by using whatever formers and ribbands you desire, a la airplane practice, and when finished you will have your own interpretation of the latest fashion in wind machines—one we have worked out in order to prove its practicability and simplicity—and which for want of a more pointed name we termed "Penguinette," which means an even more abbreviated ship than a Penguin. She is the first car to be termed a "puffmobile." And there you are.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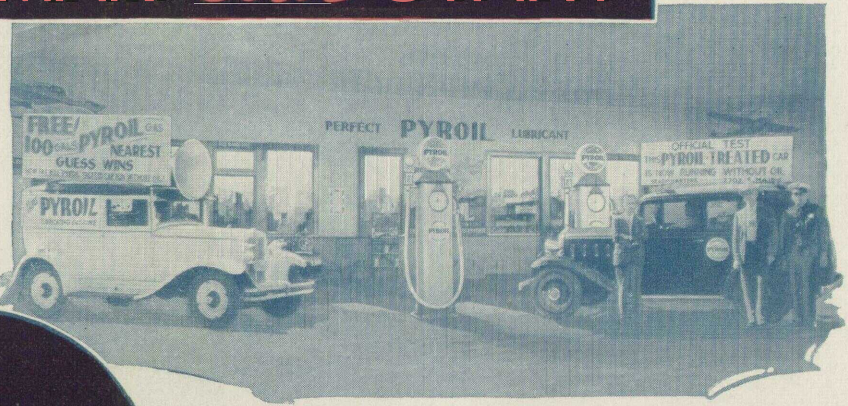
This beautiful **100%** PYROIL FILLING STATION in a **Southern** Texas city is a vivid example of what Pyroil Distributors are now accomplishing in all parts of the country. The Distributor for the territory **in** which this Service Station is located joined the Pyroil ranks only **four** months ago with a small first order.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This famous product is succeeding because it fulfills its every claim. Simply added to gas and oil Pyroil instantly gives motors new life . . . frees valves, seals rings, reduces wear and noise, increases power. Sheaths every metal part with a surface of protection which is actually ***self-lubricating*** in emergencies. ***Lubricates*** *safely* where oils burn, freeze and wash away. Completes lubrication wherever oil is used.

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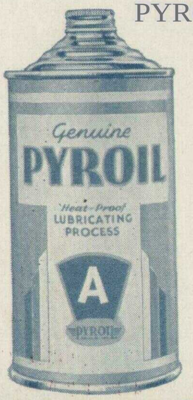

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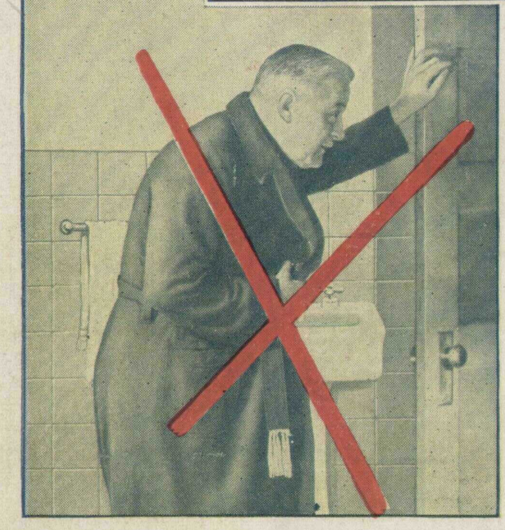

Stop Getting Up Nights!

It is a Symptom of Vital Gland Failure!

MEN past forty should know the real meaning of a weakness that attacks millions of men in middle life. Doctors say that night rising in many cases is a serious symptom—one of Nature's surest warnings of the degeneration of a vitally important male gland—the prostate.

So little-known is this gland that few men even realize it exists. Yet if unchecked, this diseased gland can actually lead to serious surgery. It makes the victim get up, from two to ten times a night. It often causes weakness and pain in back and legs. The victim is frequently "blue"—worried unaccountably—always tired, victimized by headaches, and loss of vitality. Frequently this gland degeneration is the real cause of severe constipation and painful piles.

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If you have any of these symptoms, you should investigate the Thermalaid treatment at once. Right now we are offering, free, a remarkable book called "Why Many Men Are Old at 40," which explains these symptoms and tells all about this dangerous gland disorder. If your symptoms are not caused by prostate, this book will set your mind at rest; if prostate trouble is the cause, it will show you how you can have the benefits of this scientific gland help at purely nominal cost. Mail the coupon today, and get these vital facts for men past 40, free and without obligation.

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